

## Effect of Application of Learning Package Guidelines on Knowledge, Symptoms Severity and Quality of life among Patients with Cytomegalovirus Colitis

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### Abstract

**Background:** Cytomegalovirus (CMV) pertains to the family of Herpes virus and is DNA double-stranded virus that affects around 70% of people worldwide. **Purpose:** The purpose of the current study is to determine how a learning package guidelines affected patients' knowledge, severity of symptoms, and quality of life with CMV colitis. **Methods:** A quasi experimental research model (pre- post test & follow up) has been utilized to conduct such study. A purposive sample of 60 adult subjects confirmed with cytomegalovirus colitis have been recruited in the current study. The following four data collection instruments were utilized: Instrument I: Interview assessment questionnaire composed of 2 parts; Part I: Patient's demographic characteristics data; Part II: Patient's knowledge questionnaire about CMV. Instrument II: Cytomegalovirus virus colitis - severity symptom scale. Instrument III: Cytomegalovirus virus colitis -QOL questionnaire. Instrument IV: Learning package and non-pharmacological regimen. **Results:** Post implementation of learning package enhanced patients' knowledge of CMV colitis, with significant variations pre/post and pre/follow-up scores ( $P < 0.001^*$ ). Furthermore, there were very statistically significant differences in mean scores of symptom severity for CMV colitis patients pre, post, and follow -up learning package. Post and follow-up learning package guidelines implementation resulted in significantly higher mean scores on CMV colitis-QOL subscales compared to pre-implementation ( $p < 0.001$ ). **Conclusion:** Patients with CMV colitis have noticed a decrease in the severity of their symptoms and an improvement in their quality of life after applying the learning package is implemented. **Recommendations:** Patients' awareness of the CMV colitis symptoms and its related factors should be raised which support its development. **Keywords:** Application, Cytomegalovirus colitis, Guidelines, Learning package, Quality of life, Symptoms Severity

**Introduction:**

One of the DNA double-stranded viruses is Cytomegalovirus (CMV) from the family of herpes viridae that is estimated to impact 70% of people worldwide and 100% in impoverished and developing nations. CMV infection is prevalent in severe acute colitis ranges from 21% to 34% (**Yerushalmy- Feler et al., 2019**). It is also an opportunistic virus that primarily infects immunocompromised patient's systems, like those with acquired immunodeficiency syndrome (AIDS), organ transplantation, haematological malignancies, cancer therapy, and corticosteroid therapy (**Salehi et al.,2024**).

However, it can also happen to healthy people who do not have an immune system. These patients typically have a mean age of approximately 30 years and come with non-specific symptoms such as hematochezia or melena, diarrhea, stomach discomfort, fever, malaise, and weight loss. These symptoms reflect mirror inflammatory bowel disease aggravation, and it is difficult to identify CMV colitis based just on clinical manifestations. Reactivation of CMV in the immunocompromised hosts can result in gastrointestinal (GI)irritation or haemorrhage as well as hematologic abnormalities such as leucopenia, thrombocytopenia, and lymphocytes (**Peck et al., 2020**).

The GI system, specially the colon and esophagus, are common locations of the CMV infection, hence early detection with prompt treatment is usually suggested, particularly in the critical patients. CMV imposes a considerable burden on quality of life. It has a particularly negative impact on social

and emotional performance, resulting in despair, as well as a rise in absence from school and work. This illness has an impact on body functions that may be more terrible than others as diabetes along with hypertension (**Alsuwailm et al., 2019**).

The gold standard to detect this type of colitis and distinguish it from other colitis aetiology like drug-induced colitis, infectious colitis, ulcerative colitis, or rectal tumors. Several ways are possible and essential in diagnosing including CMV culture and quantification polymerase chain reaction (PCR) (**Levin et al .,2021**). Endoscopy often reveals ulcers with a distinct punched-out shape in 70-80% of patients in addition to colonic mucosal biopsies stained with hematoxylin and eosin (**Suzuki et al., 2020**).

Misdiagnosis can be challenging, especially during reactivation, and can induce tissue-invasive end-organ damage to the gastrointestinal tract, including long term inflammation, perforation of the large bowel, toxic megacolon, pseudo-membrane formation, ischemic colitis, and severe haemorrhage. Typically, it causes financially a major burden because of its direct and indirect healthcare costs. The majority of people diagnosed with CMV colitis may refuse antiviral treatment due to the severity of adverse effects such as myelosuppression, hepatotoxicity, nephrotoxicity, and central nervous system abnormalities. Furthermore, treatment is not permitted for those over the age of 55 who have a serious illness and immune-related co-morbidities such as diabetes or chronic renal failure

(O'Hara et al.,2019).

CMV colitis is a primarily illness based symptom. Therefore, it attempts to manage manifestations such as loose motion or constipation, and/or pain, using a combination of pharmacological and non-pharmacological treatments (Picoli et al., 2018). Topics of interest to such individuals include modifying their diets, coping approaches to lessen manifestations, and preventing colitis episodes through amazing advancements. Fined melittin, the primary component of bee venom derived from the poison sac of a living honey bee, is a natural antiviral medication that has no adverse effects on the body's organs. It has been found to have exert anti-cancer, anti-inflammatory, an inhibitory effect on nuclear factor kappa (NF-kB), antidiabetic, anti-infective, and adjuvant properties (Memariani et al.,2019).

The CMV colitis management is challenging. It requires a multidisciplinary team of gastroenterologists, infectious disease specialists, and specialized nurses. A coordinated way to communicate with patients at high risk of disease can help early detection and provide timely manner management. Highly trained nursing personnel can support the clinical care team by teaching patients about symptom monitoring, which can help detect potential infections early on. They can also assist with monitoring of the drug and identifying potential interactions between drugs to reduce side effects. This, in turn, will prioritize collaborating with patients to make diet changes, manage underlying causes, and improve clinical outcomes (Austin et

al., 2020).

Dietary changes and lifestyle manner are mostly preceding medical therapy. Absence of physical activities, insufficient dietary intake reached in vitamins, and lack intake of honey enriched with bee venom rich in melittin can contribute to developing of CMV. Therefore, diet management may benefit CMV patients (Hoveyda et al., 2020). On the other hand, avoid meals rich in indigestible carbohydrates, caffeine, and high lactose (Zeinhom & Elnakib, 2022).

For those with chronic illnesses, CMV colitis health education is essential. It can be promoted by giving clinical information to help solve problems caused by long-term ailments. Because it educates nurses how to screen for treatment response, improve quality of life, knowledge, and convey the patient's condition to the rest of the healthcare team, nursing specialty education is essential to the care of patients with CMV (Patel & Shackelford, 2020). Therefore, establishing such a program is essential to helping patients achieve their maximum level of competence and self-efficacy (SE) and to lessen the anxiety and tension that this illness may occasionally cause (Magharei et al., 2019).

#### **Significance of the study:**

The number of patients with CMV colitis following up in gastroenterology outpatient clinic at university hospital of Qena in the last year was 1420 cases reported by the Qena hospital statistical record (2022). Yet, clinicians' instructions for screening and managing patients exposed to cytomegalovirus does not align with empirical evidence.

Currently, there are no recommendations from any medical or nursing association to address inaccurate and incomplete information about colitis, including its causes and prognosis. As a result, a study for evaluating the effect of learning package on knowledge, symptoms severity and quality of life in patients with cytomegalovirus colitis in the Egyptians having CMV is needed. Learning package guidelines along with non-pharmacological therapy may help to alleviate symptoms and enhance CMV patients' quality of life.

**Operational definition:****Cytomegalovirus colitis:**

It is operationally defined as viral infection causes chronic or a life-long carrier colitis with intermittent reactivation and other GIT complications. CMV colitis is a rare but underappreciated risk factor of chronic loose motions in immunocompromised patients. In this study CMV has been diagnosed through colonoscopy and getting biopsy for culture in order to confirming its positively

**Purpose:**

The purpose of the current study was to determine effect of application of learning package guidelines on knowledge, symptoms severity and quality of life among patients with cytomegalovirus colitis

**Research hypothesis:**

Our hypotheses were developed in order accomplish purpose of study:

**H1:** Total score of knowledge shall be improved among CMV colitis patients post applying learning package guidelines than before.

**H2:** Severity level of symptoms shall be decreased among CMV colitis post applying learning package guidelines than before.

**H3:** Quality of life scores will be improved post applying learning package guidelines than before.

**Subjects & Method:****Research design:**

Quasi-experimental research type (pre-posttest and follow up) utilized for implementation this research.

**Setting:**

The present study carried out at Qena university hospital's colonoscopy unit and Gastroenterology outpatient clinic. The colonoscopy unit located at first floor, consists of four rooms which receive patients pre and postoperatively. It has 8 bed capacity and highly equipped with monitor and oxygen. Concerning the outpatient unit, located at outpatient building, one floor only with waiting room plus education room for counselling equipped by data show and aboard.

**Sampling and sample size:**

A purposive sample of 60 adult subjects confirmed with cytomegalovirus colitis were selected to participate in the present study. The G power software program was used to estimate sample size by computing statistical power analyses for many different  $t$  tests,  $F$  tests,  $\chi^2$  tests,  $z$  tests and some exact tests. Also, it displays graphically the results of power analyses to provide the effect size conventions as “small,” “medium” and “large,” based on Cohen's suggestions.

**The patient's inclusion criteria:**

The inclusion criteria of the patients

included both genders, and their age ranged from 18 to 60 years recruited according to (Ljungman et al., 2021); Hematochezia/ melena, diarrhea, abdominal pain, fever, malaise, weight loss, in addition to CMV biopsy culture after colonoscopy positive. This study excluded Crohn's disease patients, diverticulitis, GI ulcers, other colitis types, and cancer colon. Instruments of data collections: four instruments were used in collecting data as follows:

#### **Instrument I: Interview assessment**

**questionnaire:** It was used for collection of socio-demographic and medical data consisting of two parts including:

#### **Part I: Patient's demographic characteristics data as:**

age, gender, marital status, educational level, occupation, smoking, duration of illness, and family history.

#### **Part II: Patient's knowledge questionnaire stationed to CMV:**

It was developed via the researchers post reviewing to literature (Austin et al., 2020; Blanshard et al., 2022) to assess the patient's medical data about cytomegalovirus colitis (definition, signs and symptoms, complications, medical and non-medical therapy, mode of transmission, source of infection, methods of prevention)

#### **Scoring system:**

A 4-point responses of Likert scale was utilized, such as poor understanding =0, pass =1, good understanding=2, and very good understanding=3.

The total knowledge scores were 99, designed as the following:

- CMV colitis definition 3
- Mode of transmission 15

- Sources of infection 15
- Complications 18
- Signs and symptoms 18
- Methods of prevention 15
- Purpose non-pharmacological therapy 9
- Medical treatment 6
- The knowledge score of patients considered satisfactory if it was 60% or higher and unsatisfactory if it was less than 60% (Zeinhom & Elnakib 2022).

#### **Instrument validity:**

The instruments were investigated for its content validity by 7 experts (5 academic medical surgical nursing staff and two gastroenterologist) at Qena University. Necessary changes got done accordingly, then instruments were finalized in final format and examined for reliability using internal consistency calculated using Cronbach alpha test (0.75) which were reliable.

#### **Instrument II: Cytomegalovirus colitis - severity symptom scale:**

This was developed by Zheng et al., (2021) to assess the symptoms severity. It included questions that used the visual analogue scale to estimate intensity of pain, pain frequency, melena, appetite satisfaction, diarrhea, and loss of weight. The lowest and highest scores were 0 and 500, respectively. Higher ratings indicated more severe symptoms. Higher ratings reflected more severe symptoms. Based on the data gathered, the scores were divided into three categories: mild symptoms (75-175), moderate (176-300) and, severe (301-500). The reliability was 0.81.

#### **Instrument III: Cytomegalovirus colitis - QoL questionnaire:**

It has been adopted from (Yan et al.,

2021) comprising thirty four items : ranging from “Not at all” to “A lot” or “Extremely” with total five response Likert scales with eight distinct subscales: dysphoria (eight items), interfering the activity (seven things), body image (four items), health concerns (three items), avoiding food (three items), social reaction (four items), sexual issues (two items), and relationships (three items). The collected scores changed on CMV colitis -QOL from 0 to 100 points, changing the severity of symptoms to a scale 0-100. Higher scores indicate good HR-QoL. Level of reliability was 0.80 (Ahmed , 2019).

#### **Instrument IV: Learning Package and Non pharmacological regimen**

containing the following:

- **Part I:** the suggested learning package: It was adopted from (Austin et al., 2020) and comprised the following: Definition of CMV colitis, mode of transmission, sources of infection, percentage of virus in the blood, signs and symptoms, effects of CMV on the different body systems methods for prevention, complications, as well as the prescribed treatment forms and its side effect.

- **Part II:** Non pharmacological Treatments and Diet Regimen

It was adopted from Kasozi et al.,2020 and approved by Gastroenterology department to force CMV ends from the body by activating the immune system against the virus.

It included:

25g of bee venom (contain 20g melittin) added to 500ml honey bee. It was prescribed as one table spoon three times a day thirteen minutes before

meals for three months.

Prescribed diets contain (Hoveyda et al., 2020) :

- Protein about (70 g/day),
- Carbohydrates (225-325 g/day),
- Fats (24g/day),
- Vitamin C (120mg/day) and zinc (12mg/day) provided after meal at lunch time until serum CMV level decreased to negative or accepted and approved as low blood level.

#### **Pilot study:**

A pilot study has been carried out on 10% from CMV patients (6 patients) in order to maintain instruments clarity and applicability. This pilot was not added in the study sample.

#### **Data collection:**

The data collection duration was 7 months, from March till September 2023. Every interview lasted around one hour utilizing instrument I. The collection of data was done through the following phases:

#### **Assessment phase: (Pretest):**

- An outpatient clinic visit was conducted to determine frequency of CMV patient and adequate time for data collection. Also, therapeutic and efficient way of communication made with nurses and doctors to illustrate nature of the research and obtain the best possible collaboration.
- Once clarification of the nature and purpose of the study obtaining approval done, patients who met the study inclusion criteria got included.
- For confirming patients' diagnosis with CMV colitis the researchers considered the results of colonoscopy and biopsy culture. Patients who matched positive for CMV were enrolled in the study and those who weren't matched were not involved.
- Researchers met patients individually and

got their written consent for participation. Interview assessment questionnaire was applied which is knowledge utilizing (instrument I part II). Then, the patient's symptoms severity was assessed (instrument II) concerned by assessment of intensity of pain, pain frequency, melena severity, satisfactory appetite, diarrhea, and weight loss. Finally, QoL assessment was taken including a question about dysphoria and effect of activity, body image, health worry, types of food avoidance, social reaction, sexual issues and relationships using (instrument III).

#### **Implementation phase:**

- Learning package was developed by the researchers via review of following literature (Bjorkman et al., 2019; Ghiyasvandian et al., 2019; Kotton et al., 2022).
- Each patient got a copy from the suggested guidelines presented in Arabic language and conducted over three sessions, each one taking about 30-45 minutes, on the morning shift once weekly.
- At the first session beginning, patients were provided orientation about the contents of the guidelines, purpose and the impact on their health condition.
- All the studied sample informed about prescribed three meals rich in protein content about (70 g/day), carbohydrates (225-325 g/day), low in fats (24g/day), vitamins C (120mg/day), zinc (12mg/day), given to patients after meal of lunch time and advising increases drinking of water up to 3-4 liter/day, till body weight was back to normal in addition to ordered non-pharmacological treatment as dietary supplement containing honey with melittin was prepared by the researcher given to patient for free as 25g of bee venom (contain 20g

melittin) added to 500ml honey bee. It was prescribed as one table spoon three times a day thirteen minutes before meals for three months till serum culture CMV level decreased to normal level or became negative. This trace element was needed to force the high immunity to destroy the virus.

#### **Evaluation phase: (post test):**

Upon implementation of the designed learning package, patient's evaluation of knowledge, symptoms severity and quality of life was done by using instrument 1, II, III, two times (after one month and after three months).

#### **Ethical consideration:**

- Written approval of the South Valley University Faculty of Nursing's Ethical and Research Committee was obtained. The written approval No: SVU/NUR/med/sur/11/65 (Date: 2/1/2023).
- A written consent was obtained from the patient after patient getting complete clarification of the purpose of the study. They were reminded that their participation in this study was voluntary. The patients were given the option to reject participation and they could have withdrawal at any of the data collection stages without giving any reason. The patients under study also declared that any information collected would be confidential and used for the research purpose only.

#### **Statistical analysis:**

The acquired data was tabulated and encoded using (SPSS) version 25. Utilizing frequency, percentage, mean, and standard deviation, descriptive analysis was performed. Chi-square was employed to compare two qualitative

variables, as well as the Wilcoxon rank test. Pearson correlation was employed to analyze the correlations between qualitative variables. P-value is  $\leq 0.05$ .

**Results:**

**Table (1)** indicates approximately half of the patients 41.67 % their age ranged from 40-to 50 y; males constitutes more than half 65.0%. In addition, greater than half 76.67 and 65.0 % of studied patients were working and smoker. With regard disease duration, more than two thirds 81.67% suffered CMV colitis for more than two years.

**Table (2)** indicates satisfactory level of knowledge increased to 8.33%, 90.0%, and 81.67% before, during, and after the application of the learning package guidelines, respectively. The pre/post and pre/follow-up phases showed a highly significant statistical difference ( $p < 0.01$ ). Finally, total mean knowledge scores of patients' post-learning package ameliorated compared to pre-learning package scores, and there were statistically significant differences in patient knowledge about CMV colitis among pre/post and pre/follow-up ( $P < 0.001^*$ ).

**Table (3):** illustrates symptoms severity distribution pre, post and follow-up learning package utilizing CMV colitis symptoms severity scale. It shows 61.67 % of patients had severe symptoms pre application of the learning package

guidelines in comparison with 11.67 % post & 6.67 % as follow up also highly significant improvement ( $P < 0.01$ ). Furthermore, highly significant statistically difference ( $P < 0.01$ ) exists in mean scores of symptom severity for CMV colitis patient's pre, post and follow up learning package intervention ( $P < 0.01$ ).

**Table (4):** Represents difference in CMV colitis -QoL domains pre, post and follow-up application of learning package. It reveals mean scores of CMV colitis -QOL. Post and follow-up learning package implementation resulted in significantly higher subscales than pre-implementation ( $p < 0.001$ ).

**Table (5)** illustrates a statistically significance positive correlation between level of knowledge and QoL at the post and the follow-up phases of application of the learning package guidelines ( $p < 0.05$ ). Also, there were negative significant correlation between level of knowledge and CMV colitis symptom severity at pre, post and follow-up phases ( $p < 0.05$ ).

**Table (6):** This table shows, there were significant negative correlation between CMV colitis -QOL score and CMV colitis symptom severity in pre, post and follow-up phases of learning package guidelines ( $p < 0.05$ )

**Table (1): Sociodemographic and medical data of studied subjects (n=60).**

Items	N	%
<b>Age (Years) :</b>		
- < 30	15	25.00
- 30 to 40	20	33.33
- > 40 to 50	25	41.67
Range:	18-55	
Mean ± SD:	32.9±12.4	
<b>Gender:</b>		
- Female	21	35.00
- Male	39	65.00
<b>Levels of education:</b>		
-Reads & writes	5	8.33
- Basic education	12	20.00
-Secondary schools	20	33.33
- Higher education	23	38.33
<b>Occupation:</b>		23.33
-Non-working	14	76.67
-Working	46	
<b>Smoking “</b>		
-Non -smoker	16	26.67
- Passive smoker	5	8.33
- Smoker	39	65.00
<b>Duration of illness:</b>		
- Less than two years	11	18.33
-More than two years	49	81.67
<b>Family history:</b>		50.00
- No	30	50.00
- Yes	30	

**Table (2): Differences of patients according to satisfactory level of knowledge about CMV colitis pre, post and follow up phases of learning package guidelines (n=60).**

(Satisfactory Knowledge (60%+))	Time						$\chi^2$ (P) Pre-post	$\chi^2$ (P) Pre-FU
	Pre		Post		FU			
	No.	%	No.	%	No.	%		
<b>1-General Knowledge about CMV colitis:</b>								
- Definition of CMV colitis	1	1.67	49	81.67	45	75.55	46.424 (< 0.001) *	36.173(< 0.001) *
- Mode of transmission	4	6.67	47	78.33	41	68.33	46.414(< 0.001) *	36.151(< 0.001) *
- Sources of infection	3	5.00	37	61.67	35	58.33	60.773(< 0.001) *	53.083(< 0.001) *
- Signs and symptoms	10	16.67	49	81.67	45	75.00	61.882(< 0.001) *	53.670(< 0.001) *
- Methods of prevention	3	5.00	46	76.67	44	73.33	54.671(< 0.001) *	49.650(< 0.001) *
- Complications	2	3.33	45	75.00	41	68.33	51.652(< 0.001) *	50.541(< 0.001) *
<b>2-Knowledge about Lifestyle Modification:</b>								
- Diet	10	16.67	56	93.33	53	88.33	47.366 (< 0.001) *	42.665 (< 0.001) *
- Exercise & relaxation technique	0	0	51	85.00	50	83.33	68.870 (< 0.001) *	64.331(< 0.001) *
- Medical treatment	15	25.00	57	95.00	55	91.67	50.163(< 0.001) *	50.163(< 0.001) *
- Non pharmacological therapy	0	0	56	93.33	53	88.33	48.104 (< 0.001) *	49.123(< 0.001) *
- Follow up	3	5.00	60	100	58	96.67	47.366 (< 0.001) *	42.665(< 0.001) *
<b>Total knowledge score regarding CMV colitis:</b>								
-Satisfactory:	55	91.67	6	10.00	11	18.33	61.351 (< 0.001) *	54.913 (< 0.001) *
-Unsatisfactory:	5	8.33	54	90.00	49	81.67		
<b>Mean <math>\pm</math> SD</b>	<b>35.09 + 12.2</b>		<b>79.7 + 15.8</b>		<b>76.6 + 20.0</b>		<b>Z:7.274 (&lt; 0.001) *</b>	<b>Z:7.263(&lt; 0.001) *</b>

*chi square test**Z: Wilcoxon test**\* significant at P value  $\leq 0.05$*

**Table (3): Distribution of patients according to CMV colitis symptoms severity pre, post and follow up phases of learning package guidelines (n=60).**

Degree of severity	Time						(P) Pre-post	(P) Pre-FU
	Pre		Post		FU			
	No.	%	No.	%	No.	%		
-Mild (75–175)	10	16.66	48	80.00	52	86.66	16.13 (< 0.001) *	13.176 (< 0.003) *
-Moderate (176–300),	13	21.67	5	8.33	4	6.67		
- Severe (301–500)	37	61.67	7	11.67	4	6.67		
Mean ± SD	215 ± 70.42		200 ± 74.13		201.03 ± 71.60		Z: 6.238 (< 0.001) *	Z: 6.232 (< 0.001) *

chi square test  
value ≤0.05

Z: Wilcoxon test

\* significant at P

**Table (4): CMV colitis -QoL domains in patients throughout pre, post and follow up phases of learning package guidelines (n=60).**

CMV colitis - QoL domains	Time			Z (P) Pre-post	Z (P) Pre-FU
	Pre (Mean ± SD)	Post (Mean ± SD)	FU (Mean ± SD)		
Dysphoria	53.8 + 16.9	73.9 + 14.1	82.5 + 18.4	6.782 (< 0.001) *	7.308 (< 0.001) *
Interference with activity	57.7 + 17.5	79.2 + 13.4	85.1 + 15.7	7.651 (< 0.001) *	7.445 (< 0.001) *
Body image	71.4 + 13.6	80.8 + 11.2	88.7 + 15.8	6.622 (< 0.001) *	6.775 (< 0.001) *
Health worry	59.9 + 22.3	81.4 + 15.7	91.5 + 18.7	6.211 (< 0.001) *	6.887 (< 0.001) *
Food avoidance	52.6 + 15.6	73.6 + 14.8	75.6 + 15.3	6.634 (< 0.001) *	6.956 (< 0.001) *
Social reaction	60.8 + 19.8	79.4 + 15.4	91.1 + 17.7	6.281 (< 0.001) *	6.712 (< 0.001) *
Sexual issues	45.9 + 15.2	71.8 + 11.5	88.7 + 16.8	4.936 (< 0.001) *	5.335 (< 0.001) *
Relationships	44.6 + 10.2	70.7 + 11.0	83.2 + 13.6	7.194 (< 0.001) *	6.384 (< 0.001) *

Z: Wilcoxon test

\* significant at P value ≤0.05

**Table (5): Correlation between patients' level of knowledge about cytomegalovirus colitis and their CMV colitis QOL score and CMV colitis -SSS score throughout the study phases (n=60)**

Phases	Total knowledge scores Pre		Total knowledge scores Post		Total knowledge scores follow-up	
	R	P	R	P	R	P
- CMV colitis-QOL Pre	<b>0.715</b>	(< 0.001) *	-	-	-	-
- CMV colitis-QOL Post	-	-	<b>0.715</b>	(< 0.001) *	-	-
- CMV colitis -QOL Follow-up	-	-	-	-	<b>0.815</b>	(< 0.001) *
- CMV colitis -SSS Pre	<b>0.539</b>	(< 0.001) *	-	-	-	-
- CMV colitis -SSS Post	-	-	<b>0.414-</b>	(< 0.001) *	-	-
-CMV colitis -SSS Follow-up	-	-	-	-	<b>0.545-</b>	(< 0.001) *

*r*: Pearson Correlation

\*Significance at *p* value < 0.05

**Table (6): Correlation between patients' CMV colitis -QoL score and CMV colitis - symptom severity score throughout the study phases (n=60)**

Items	CMV colitis -QOL Pre		CMV colitis -QOL Post		CMV colitis-QOL Follow-up	
	R	P	R	P	R	P
-CMV colitis-SSS Pre	<b>0.715-</b>	(< 0.001) *	-	-	-	-
-CMV colitis-SSS Post	-	-	<b>0.616-</b>	(< 0.001) *	-	-
-CMV colitis-SSS Follow-up	-	-	-	-	<b>0.741-</b>	(< 0.001) *

*r*: Pearson Correlation

\*Significance at *p* value < 0.05

### Discussion:

Gastrointestinal (GI) diseases caused by Cytomegalovirus are common and can involve various parts, including the oral cavity, esophagus, stomach, small intestine, and large intestine. The bowel is the most common site of CMV-GI infection and the only accurate diagnosis

requires colonoscopy with tissue biopsy. (O'Hara et al., 2019) In addition to impairment in QoL in those patients when compared with the other population, knowledge is thought to be a gold indicator for the diagnosing of CMV colitis (Sutherland et al., 2021) This study has found out that half of

patient are smoking males with age between 40- 55 years. This result supports the findings by (Lee et al., 2021) who confirmed that advancing age, regardless of a relatively small age range and by middle adulthood with up to 85% by 40 years of age, and tobacco smoking both contribute significantly to inter-individual immune diversity leading to acquired CMV seropositivity. Notably, we independently associated with a larger effect in heavy smokers and those with CMV colitis. The majority of studied patients had disease duration of greater than two years. This is in consistence with (Azer &Limaïem ,2024) who mentioned that the duration of more than 2 years the of disease ranged from 61% to 74%. It has been found that 84.5% of patients with acute colitis and up to 25% of individuals who require a colostomy for severe colitis reactivate the virus during a five-year period.

In the present study, prior to applying the learning package guidelines, patients lacked knowledge of CMV colitis. The management of cytomegalovirus (CMV) colitis is challenging, and novel techniques have been offered, contributing to the lack of knowledge and an abundance of instructional resources. In addition, there is an abundance of instructional resources and inaccessibility to sources of knowledge on this disease and its impacts. So, to achieve a satisfactory outcome, the basics and clinical aspects of cytomegalovirus colitis must be clearly defined. This reflects a deficit in provider's educational role. In terms of level of knowledge, post and follow-up implementation of learning package, our study showed that there was statistically

significant improvement in all defined items. (Kotton et al., 2022) stated a statistically significant improvement was found with level of knowledge for CMV colitis patients after patient education on symptom follow-up as well as compliance with clinical monitoring comparably with pre- education, after finished 3 months' follow-up period.

This finding supported with (Barling et al., 2020), who assured CMV colitis patients provided with precise description about their condition, emotional support, diet regimen, treatment options and non-pharmacological therapy guidelines, there was a significant diminution in misconceptions related CMV colitis post three months of essential educational intervention and then teeter to negative viremia, compared with the beginning of the intervention. Also, (Agholi, et al.,2020) revealed the difference between the pre and post-test for study and control group regarding the instructional program was significantly improved for study group. Current findings concurrent with results revealed from another study who enforced teaching program for about 200 patients for correcting the misconception about prevalence and causes of CMV. They reached a conclusion that around 85% of patients are dissatisfied with their level of information or felt under educated, and stated that greater number of patients haven't knowledge about diagnostic process, avoids triggers, coping mechanisms, new drugs, and the importance of non-pharmacological aspects.

Concerning to the CMV colitis manifestations severity, the current study

revealed a statistically significant improvement in severity of CMV symptom at pre- and post-test comparison, and mean scores of CMV colitis symptoms severity reduced significantly post application of the learning package, relative to pre-implementation of learning package. This could be related to patients' desire to learn and practice relieving ways for overcoming the overwhelming condition that bothers them. The results are in line with those (Ahmed et al., 2019) who mentioned that CMV colitis is associated with a better outcome if left belonging two weeks educational program than one week. However, improvement in knowledge and facilities is required to enhance patient's prognosis.

In the present research the majority of patients on the total score of quality of life was determined pre-application of learning package guidelines compared with moderately increased post and highly increased in follow-up with significant improvement in patients' post and follow-up phases learning package. This could be evidence about motivational factors and beneficial impacts of learning package intervention. This finding is consistent with findings of Pasvol et al. (2020), who stated that implementing the program of self-care improved quality of life and reduced symptom severity in the research group. This is additionally in accordance with (Gismera & Aladren, 2021) who contend that supporting patients to participate in self-care as well as creating approved educational tools contribute to a greater awareness of the nature of the disease. The identification of factors that increase

risk is critical for optimal care and providing these patients with longer relapse-free intervals, hence enhancing their quality of life.

Efficient communication skills between patients and nursing staff and can lead to greater information convection to the patients and could support them in managing self-care in which patient understanding and engagement in their care is crucial. In line with (Yong et al., 2020), CMV colitis patients who received organized training groups (60 subjects) versus patients who received instruction by pamphlet (60 subjects) experienced a higher reduction in the severity of symptoms and improved knowledge about CMV colitis. Furthermore, in the training group, some of patients noticed a considerable increase in QoL, although QoL not improved in other groups. Also, (Blanshard et al., 2022) demonstrated that post implementing the teaching intervention, the CMV colitis -QoL improved dramatically. Moreover, consistent with (Sierzantowicz et al., 2020), who noticed that despite long-term drug therapy, the QoL for patients with CMV colitis was significantly lower in the control group, meeting patients' expectations and implementing a varied educational therapy program resulted in a significant improvement in QoL for CMV colitis people, resulting in a significant reduction in the symptoms severity. Furthermore, in addition to medication, personalized learning and non-pharmacological therapy might be viewed as essential therapeutic components for individuals with CMV colitis. In overall, identifying any symptoms, individuals with CMV go to

physician, who frequently recommends treatment and doesn't have time to teach any about the disease. As a result, they must be educated how to manage disease's manifestations.

This study revealed a negative correlation between CMV colitis -QoL and symptoms severity score in pre-, post-, and follow-up phases, indicating lower symptoms severity score was associated with higher CMV colitis-QoL. This is consistent with the findings of Giyasvandian et al. (2019), who discovered a significantly negative correlation ( $p = .02$ ,  $r = -.72$ ) significantly between CMV colitis patients' quality of life and intensity of symptoms. Moreover, Torkzadeh et al. (2021) revealed that severity of CMV colitis symptoms is directly proportional to the utilization of inadequate coping strategies (emotive and fatalistic) and inversely proportional to recruiting positive techniques. Also, Bjorkman et al., (2019) noted a prevalent CMV colitis and frequently persistent functional GI diseases that can cause significant disruption to daily workflow of people affected, resulting in high healthcare utilization and absence from work. Finally, the analysis of data and discussion supported the current study's research hypotheses.

### **Conclusion:**

The current research has revealed a significant statistical improvement in patients' attending learning package concerning CMV colitis with total mean knowledge score greater than before/post followed, their non-pharmacological regimen with honey rich in melittin and nutrition. Also, applying of learning package and acquiring their knowledge,

improved their disease symptoms severity and quality of life when compared with the post test.

### **Strengths and limitation of the study:**

The study strengthened by its content & results. It's considered one of the few studies performed on cytomegalovirus colitis in Egypt with greater significant impact on patient's knowledge, quality of life and symptoms severity of CMV colitis with some limitations including smaller sample size was utilized and all subjects were recruited from Qena university hospital.

### **Recommendations for clinical practice:**

According to the findings of the current study, it is recommended the following points:

-CMV colitis diagnosed patients should receive a planned learning package program for controlling disease manifestations for limiting its unaffordable effect on the quality of life.

### **Future recommendations:**

- Instructional programs for these patients must be implemented on a regular basis, including the family and care provider participating in the care of the CMV colitis patient.  
- Further research on a large sample of CMV colitis patients should be performed to confirm the results and generalization.

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