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## RESEARCH ARTICLE

**STUDY OF DRUG COMPLIANCE AMONG DIABETIC PATIENTS**Aruna.T\*<sup>1</sup>, Srirupa.H\*<sup>2</sup>, Sankara Subramanian<sup>2</sup>, Swathika<sup>2</sup><sup>1</sup>Professor, Dept of Pharmacology, Government Kilpauk Medical College, Chennai, Tamil Nadu, India<sup>2</sup>Medical Student, Government Kilpauk Medical College, Chennai, Tamil Nadu, India\*Corresponding Author email: [arunabala511@gmail.com](mailto:arunabala511@gmail.com), [justmerupa@gmail.com](mailto:justmerupa@gmail.com)

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**ABSTRACT**

Diabetes is one of the most common ailments that the general population suffer in today's world. Some are aware about their disturbing blood sugar levels and even understand the importance of appropriate control of the levels with the right medications. Some are aware and yet ignorant due to various causes. This study is aimed at evaluating the drug compliance among type 2 diabetes patients attending the review op of the department of Diabetology, KMCH. A study group of 100 patients attending the review OP were enrolled in the study. The compliance was assessed with the help of their diabetic OP records and a pretested questionnaire was used to further dig into the possible causes for non compliance. The study is broadly based on two main factors leading to non-compliance-causes for patients not getting medicines regularly and causes for patients not taking medicines regularly. These two factors were analyzed based on gender, age, duration of diabetes, co morbid illness, distance etc. The results have shown that 39% of the patients were not getting the medications regularly, out of which 33.3% did not get it due to sheer laziness, 38.5% were forgetful and other serious illness hindered 28.2% of the patients from getting their medications. It was found that 55% of the patients took their medications regularly. Among those who took medications regularly, 80.3% were regular and 15.4% were not regular in getting medications. Among those who did not take medications regularly, 66.7% claimed to be forgetful and 46.7% were non complaint as they did not have adequate knowledge about their medications. 33.3% of the patients did not take it regularly as it gave them a feeling of wellbeing which tempted them to skip doses. Based on these significant data, we will be able to suggest ways and measures to improve the compliance on the treatment aspect. This would increase the desired therapeutic outcome and ultimately, on a broad aspect, it will reduce national health costs.

**Key words:** drug compliance, therapeutic outcome**INTRODUCTION:**

Drug compliance can be defined as reliability of a patient in using a prescribed medication as ordered by the physician.<sup>1</sup> The importance of this term comes into picture when a person suffering from a chronic ailment is put on long term medications. Such situations come for diseases like diabetes, hypertension, arthritis, tuberculosis etc. Diabetes Mellitus (DM), the most common endocrine disease in the world, is a major global public health issue.<sup>3</sup> As a group, patients with diabetes are especially prone to substantial regimen adherence problems.<sup>4</sup> Noncompliance occurs when the patient forgets or neglects to take the prescribed dosages at recommended times or decides to discontinue the drug without consulting the physician.<sup>1</sup> Effective and successful glucose control requires appropriate and timely use of medication over the entire period of treatment, which is often lifelong. Poor treatment adherence that contributes to suboptimal glycemic control continues to be one of the major barriers to effective diabetes management. Treatment failure is in turn associated with reduced treatment benefits and can have a negative financial burden on both individual patients and the society at large.<sup>9, 10</sup> In

fact, effective diabetes management often needs coordinated quality services<sup>11</sup>.

The World Health Organization has reported that as many as fifty percent of the patients with chronic diseases do not take their medications as prescribed;<sup>2</sup> Diabetes is a common but easily treatable condition and yet the control in the society is poor due to this major factor of drug compliance. Drug compliance isn't a new challenge. It is mentioned by the Hippocrates many thousands of years ago. It's an old issue but it's very crucial. For this reason, drug compliance has been called the "next frontier in quality improvement" and is an important part of diabetes therapy outcomes.

There are many factors which affect compliance. When they are listed, we will be able to suggest ways and measures to improve the compliance on the treatment aspect.

**AIM:**

This study aims to evaluate the drug compliance among type 2 diabetes patients and infer the factors determining drug compliance.

**OBJECTIVE:**

- ✓ To evaluate drug compliance among type 2 diabetic patients.
- ✓ To analyze the causes and consequences of non compliance based on a questionnaire.

**METHOD AND MATERIALS:**

Ethical clearance was obtained from Govt. Kilpauk medical college ethical committee.

**Study design:**Cross Sectional Study

**Study Duration:** Four weeks

**Study Group:** One hundred patients attending the review op of the department of Dialectology, KMCH. Informed oral consent was obtained from the patients.

**Inclusion criteria:** Patients with duration of diabetes 1-10 years

**Exclusion criteria:**

- Patients with acute complications of diabetes
- Duration of DM>15 years

Basic details were collected from the patient. Here patients carry a book which includes the basic demographic data (name, age, place of residence, a passport size photo, duration of diabetes, weight, B.P) the presenting complaints ,the investigations ordered, the blood sugar levels checked at various intervals, medications prescribed and complications if any present. The date at which they come to refill the prescription is also mentioned. From these records, compliance was assessed. Further evaluation to find out

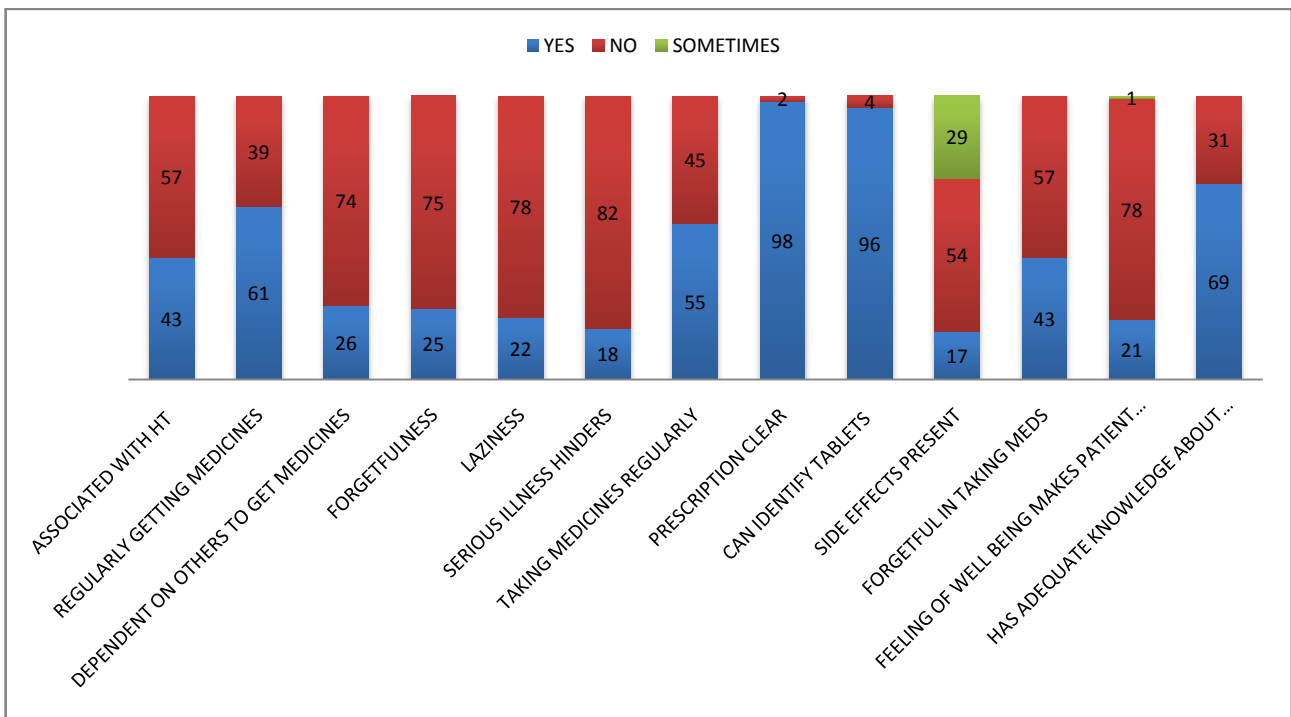
the causes for non-compliance was assessed by using a pretested questionnaire. Leading questions were not asked at first, the patients were allowed to give their own reason for non compliance, which was noted. Then the common factors contributing to non compliance like negligence, lack of adequate knowledge, forgetfulness, distance from the hospital etc were enquired. The collected data was then analyzed based on two major platforms-one,if the patient got the medications regularly and two, if he took the medicine he got from the hospital. Comparison was made based on various factors such as distance, negligence, other co morbid illness, knowledge about their medications , gender, side effects etc.

**RESULTS:**

Among 100 patients enrolled in the study,61% got their medications regularly and 55% were taking their medications regularly.80.3% of those getting their medications were taking their medications regularly (p<0.001).The causes of non compliance were broadly divided into –patient related factors (age, gender, distance from home, dependents, serious illness), therapy related factors (side effects, patients’s knowledge, other medications)and psychological factors(negative attitude, laziness, disbelief etc).

The following graph explains the distribution of the study group based on the questions that were put forth to them in the questionnaire. These questions were pertaining to their health profile (if associated illness like hypertension was present), if they were regular in getting/taking medications, various reasons for not getting/taking medications regularly etc.

**GRAPH 1: Distribution of study group based on questionnaire**



The following table is a comparison of patients' regularity in getting medications from the review OP with various factors. Here we can infer that forgetfulness (38.5%), laziness (33.3%) and other serious illness (28.2%) hinders patients from getting their medications regularly.

**TABLE 1: Comparison of patients getting medicines with various causes for not getting medicines**

		Q1.0 Patient regularly getting medicines				Total		P-Value
		No		Yes		N	%	
		N	%	N	%			
Q2.1 Distance of the hospital from house	< 4 km	6	15.4	11	18.0	17	17.0	0.364
	4 - 6 km	12	30.8	24	39.3	36	36.0	
	> 6 km	21	53.8	26	42.6	47	47.0	
Q2.2 Dependent on others for coming to hospital	No	30	76.9	44	72.1	74	74.0	0.594
	Yes	9	23.1	17	27.9	26	26.0	
Q2.3 Forgetfulness	No	24	61.5	51	83.6	75	75.0	0.013
	Yes	15	38.5	10	16.4	25	25.0	
Q2.4 Laziness	No	26	66.7	52	85.2	78	78.0	0.029
	Yes	13	33.3	9	14.8	22	22.0	
Q2.5 Serious illness hinders	No	28	71.8	54	88.5	82	82.0	0.034
	Yes	11	28.2	7	11.5	18	18.0	
Total		39	100.0	61	100.0	100	100.0	

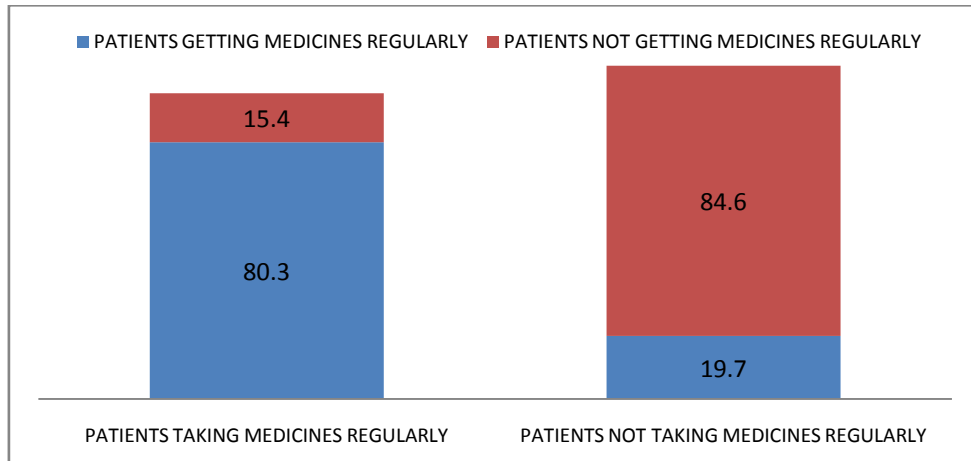
The below table 2 compares patients who take medications regularly with various factors. Forgetfulness again plays an important role in non-compliance accounting for 66.7%. Some do not take their medications because they do not have adequate knowledge about it (46.7%).

**TABLE 2: Comparison of patients taking medicines with various causes for not getting medicines**

		Q3.0 Patient taking medicine regularly				Total		P-Value
		No		Yes		N	%	
		N	%	N	%			
Q4.1 Prescription pattern clear & well understood	No	2	4.4	0	0.0	2	2.0	0.200
	Yes	43	95.6	55	100.0	98	98.0	
Q4.2 Identification of tablets is easy	No	2	4.4	2	3.6	4	4.0	0.612
	Yes	43	95.6	53	96.4	96	96.0	
Q4.3 There is side effects	No	20	44.4	34	61.8	54	54.0	0.124
	Yes	11	24.4	6	10.9	17	17.0	
	Sometime	14	31.1	15	27.3	29	29.0	
Q4.4 Forgetful in taking medicines	No	15	33.3	42	76.4	57	57.0	<0.001
	Yes	30	66.7	13	23.6	43	43.0	
Q4.5 Patient having adequate knowledge about the treatment	No	21	46.7	10	18.2	31	31.0	0.002
	Yes	24	53.3	45	81.8	69	69.0	
Q4.6 Feeling of well being makes the patient to skip few doses	No	30	66.7	48	88.9	78	78.8	0.007
	Yes	15	33.3	6	11.1	21	21.2	
Total		45	100.0	54	100.0	99	100.0	

The following graph compares the two important variables of the study-those getting medications regularly with those taking medications regularly.

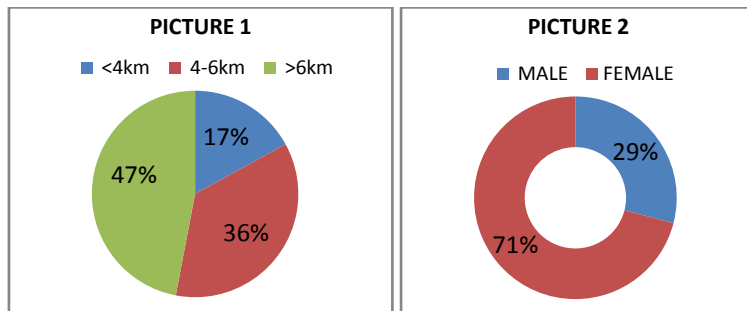
**GRAPH: 2 Comparisons of patients getting medicines regularly with patients taking medications regularly**



**Patient related factors:**

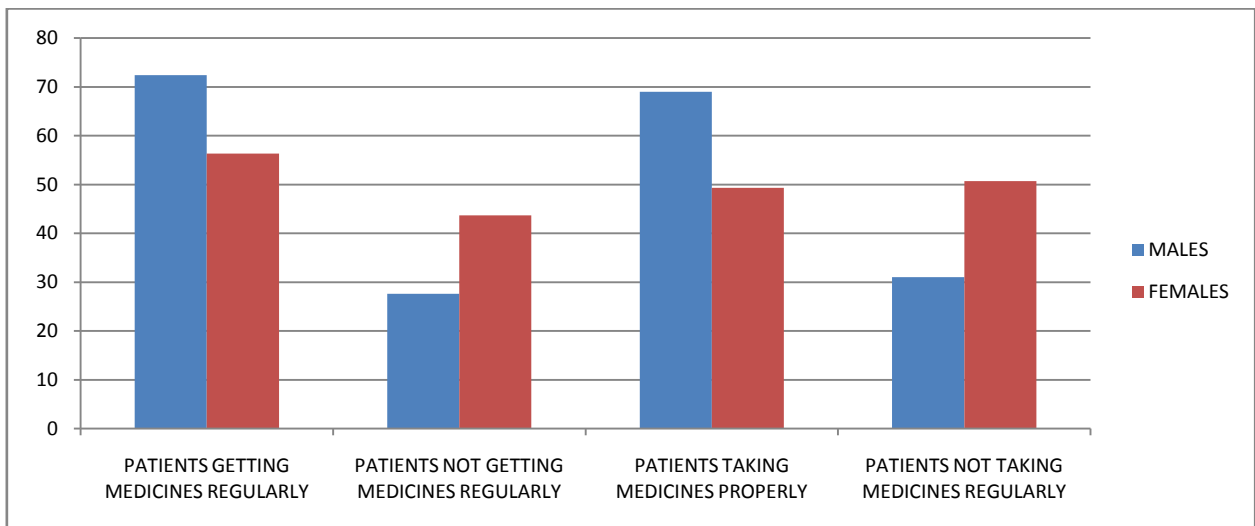
The study had 71% females and 29% males.47% were staying >6km from the hospital and 26% were dependent on others to get their medications from the hospital. About 18% were seriously ill which hindered them from getting medications.

**Picture 1: distribution of study population based on distance from hospital**  
**Picture 2: distribution of study population based on gender**



42.6% of the people got medication regularly in spite of staying >6km from the hospital. Among regularly getting medications, 72.4% were males.50.7% of females did not take regular medications. 27.9% got medications by depending on others. 28.2% did not get medications as they were suffering from some serious illness (p=0.034).

**GRAPH 3: Comparison of gender with patients getting and taking medicines regularly**



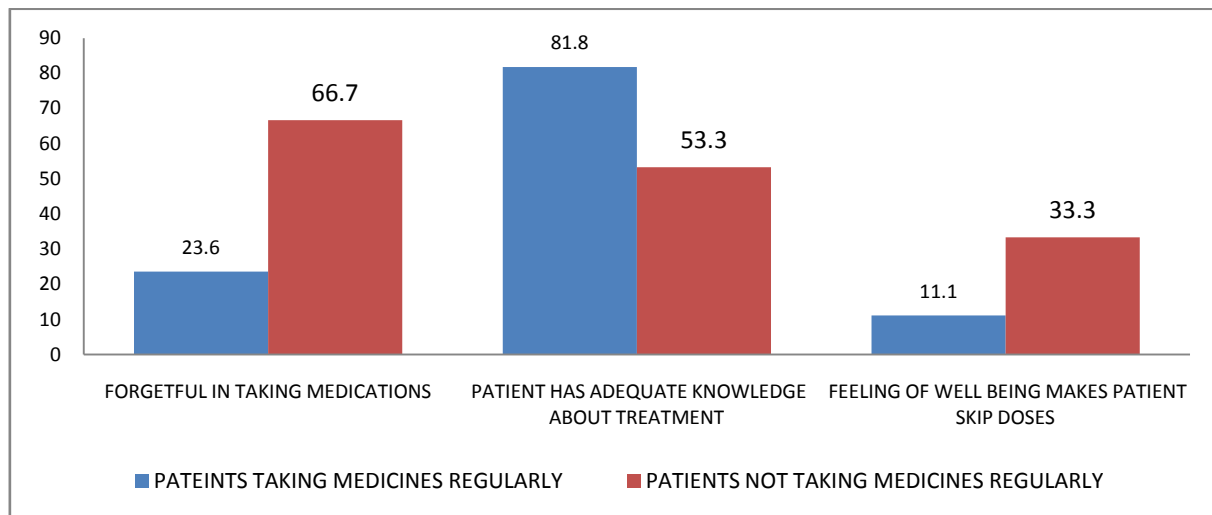
**Psychological factors:**

38.5% did not get regular medicines due to forgetfulness (p=0.013) and 33.3% due to laziness (p=0.029). About 66.7% did not eat their medications due to forgetfulness (p<0.001). 53.3% did not take medications in spite of having adequate knowledge about treatment (p=0.002). Some patients skipped doses when they felt better. This constituted 33.3% of those who did not take medicines regularly (p=0.007).

**Therapeutic factors:**

The study group had 43% with associated hypertension. 98% were able to understand their prescription well and 96% could identify their tablets easily. 17% claimed to have experienced side effects. And 69% claimed to have adequate knowledge about their treatment.

**GRAPH 4: Comparison of various psychological and therapeutic factors for patients to take medicines regularly**



**DISCUSSION:**

The rate of non-compliance in patients with chronic diseases in developed countries, on long-term treatment, is on the order of 50%. This could be even higher in developing countries (WHO)<sup>14</sup>. Individuals with low socioeconomic status cannot access education, information, transportation and obtain the required drugs on time. This may increase patients' difficulty to follow diabetes treatment<sup>15, 16</sup> (Seligman et al. 2012; Drewnowski and Darmon 2005). If the patient feels that the cost of therapy is a financial burden, the compliance with therapy will definitely be threatened causing low adherence<sup>17</sup> (Jin et al. 2008). Since most of the patients in our chosen study group have similar difficulties such as transportation, awareness and motivation, we can easily relate these factors to be of utmost importance when it comes to both receiving and consuming the

medications regularly. Different studies have shown that adherence to diabetes treatment has been highly varied and may range from 1.4 to 88.0%<sup>5, 6, 7</sup>. We have concluded from our study that the main reason for non-compliance is never the same even among the patients of the same age group. Some believe that just by a proper diet plan they can control their disorder. Some patients feel side effects from the prescribed medications might interfere with their day to day life. Some believe in alternate medications such as Ayurveda or siddha for a better cure. As such compliance towards prescribed medications comes down. The World Health Organization has categorized potential reasons for medication nonadherence into 5 broad groupings that include patient, condition, therapy, socioeconomic, and health system-related factors.<sup>19-33</sup> Examples for each of these categories are detailed in the Table 3.

**Table 3: Reasons for Medication Nonadherence**

Categories of Nonadherence	Examples
Health system	Poor quality of provider-patient relationship; poor communication; lack of access to healthcare; lack of continuity of care
Condition	Asymptomatic chronic disease (lack of physical cues); mental health disorders (eg, depression)
Patient	Physical impairments (eg, vision problems or impaired dexterity); cognitive impairment; psychological/behavioral; younger age; nonwhite race
Therapy	Complexity of regimen; side effects
Socioeconomic	Low literacy; higher medication costs; poor social support

We used a similar approach in our study by highlighting non-compliance due to factors that are patient-centered, therapy-related, or healthcare system – related<sup>12</sup> The patient-centered factors can be demographic (age, gender, educational level, and marital status) and psychological (patients' beliefs and motivation towards the therapy, negative attitude, patient-prescriber relationship, understanding of health issues, and patient's knowledge).<sup>13</sup> The therapy-related factors include route of medication, duration of treatment, complexity of treatment, and the side effects of the medicines. The factors associated with the healthcare system include availability, accessibility, and the physician. In addition, it is common for patients to improve their medication-taking behavior shortly before and after an appointment with a healthcare provider, which has been termed "white-coat adherence."<sup>34</sup> Makaryus et al<sup>35</sup> found that <50% of patients were able to list all of their medications, and even fewer could recount the purpose of their medications at hospital discharge, which suggests that system factors like the educational process at hospital discharge can impact medication adherence after discharge.

Low adherence to prescribed diabetes medications accounts for 30% to 50% of treatment failures, leading to worse treatment outcomes and which cause damages to vital organs<sup>8</sup> One study showed that while diabetic and cardiac patients who take medication correctly have a 7% death rate; for those who are non-compliant the death rate is 12%.

To date, interventions targeting medication adherence have produced only modest success. In general, unimodal interventions have been less successful than multimodal interventions, because the reasons for nonadherence are often multifactorial.<sup>36-40</sup> Multimodal interventions have shown the most promise and have improved both adherence and outcomes. For example, Piette et al<sup>41,42</sup> randomized veterans with diabetes mellitus to an intervention that consisted of

telemonitoring with interactive voice response technology and weekly nurse feedback and demonstrated improvements in medication adherence and diabetes-related symptoms, as well as a trend for improvement in hemoglobin A1C. Family relationships play an important role in diabetes management. Studies have shown that low levels of conflict, high levels of cohesion and organization, and good communication patterns are associated with better regimen adherence.<sup>43</sup> Greater levels of social support, particularly diabetes-related support from spouses and other family members, are associated with better regimen adherence.<sup>44</sup> Social support also serves to buffer the adverse effect of stress on diabetes management.<sup>45</sup> from the hospital point of view efforts can be taken to develop proper rapport with the patient win his confidence and counsel him about the importance of his compliance. Motivation is thus the key here. In our study we found that highly motivated patients overcame their problems like distance, associated illness, financial constraints etc. in order to receive their medications from the OPD. Patients who are forgetful/lazy to get/take medications are mostly those who are either unaware about their condition or are ignorant. Such patients must be specifically targeted for proper counseling about their condition, the importance of taking medications that are prescribed.

#### CONCLUSION:

Diabetes is a burden which still can be managed appropriately if patients and health care personnel work as a team to ensure drug compliance. Doctors and other health professionals must always monitor how complaint their patients are and dig out the causes of their non-compliance by being open to their apprehensions and helping them overcome it in a positive manner.

Once this is achieved control of diabetes and its efficient management can be implemented at various levels.

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