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Clinical Outcome of Diabetes Patients with Asthma Complications Using Corticosteroids

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Abstract

Diabetes and asthma is disease No infectious However prevalence his Enough big in Indonesia. Study This aim For knowing the clinical outcome of diabetes patients with complications asthma who uses corticosteroids. Study This use method cohort retrospective and prospective for 3 months. Of 150 patients , 76% were Woman with level education the most namely SMA 44%. Obtained results prevalence use corticosteroids is methylprednisolone namely 45.4% with a period of use of 6-10 years. There is no significant relationship between type corticosteroids with clinical outcomes. Can concluded that the clinical outcome of patients who lived was 96.7% and those who died namely 3.33% as well No there is significant relationship between type corticosteroids with clinical outcomes.

Introduction

Diabetes mellitus is disease No contagious being one of them threat global health . Diabetes mellitus or hyperglycemia is something condition medical form enhancement rate glucose blood exceeds the normal limit characteristics a number of disease especially diabetes mellitus beside various condition others. Disease No infectious other that is asthma, which became problem serious global health influence all group age (Serebrisky & Wiznia, 2019).

The prevalence of diabetes mellitus in Indonesia is the highest that is DKI Jakarta Province which reached 2.6%. Based on study Handayani & Suraya (2020) explains that its height The prevalence of diabetes mellitus in the community in DKI Jakarta Province has significant relationship with age, activity physical, history of diabetes mellitus and history hypertension. In DKI Jakarta Province, prevalence asthma reached 2.6%. Based on research conducted by Wu (2021) shows that disturbance metabolism glucose especially hyperinsulinemia / resistance insulin can linked with condition worsening asthma, however condition the appear in network disease metabolic related Obesity can worsen asthma. In line with research by Hou et al. (2022) in Indonesia is known there is connection positive between prevalence of diabetes mellitus with prevalence asthma with mark significance 0.003 ($p < 0.05$).

Risk of adverse events (AE) of diabetes mellitus in a given patient therapy ICS treatment such as budesonide for therapy asthma increase with exists increase age, increasing BMI and increasing severity measured asthma with initial decrease in FEV1. But ICS use for 1 year No increase risk of new- onset diabetes. One of therapy used in treatment asthma that is corticosteroids both oral and inhalation (ICS). Effect side use corticosteroids that is happen enhancement Diabetes risk and control worsening glycemia in patients with known diabetes (known. This in accordance with research by Das et al. (2020) with cross-sectional study on 45

subjects obtained that there is correlation positive between corticosteroids inhalation with blood sugar levels, with enhancement dose moment fasting and improvement blood sugar levels post eating in non-diabetic individuals.

Use corticosteroids chronic or dose tall can cause new onset diabetes . Meanwhile in patients with comorbid diabetes mellitus previously, shows that use corticosteroids in a way chronic cause risk take care 94% more stays tall Because complications of diabetes mellitus. Peak happen enhancement glucose blood patient occurs 7-9 hours after giving corticosteroids. In patients with history use drug Oral antidiabetics are recommended replacement therapy using insulin. There is an increase incident hyperglycemia in patients so can increase insulin requirements exceed dose standards in general, so use corticosteroids in diabetes mellitus patients need need done monitoring periodically related glucose blood and condition clinical patient For avoid the patient 's prognosis toward worsening.

Based on description above, then will done study regarding the clinical outcome of diabetes patients with complications asthma who uses corticosteroids. Study This aim For knowing clinical outcomes in diabetes mellitus patients with complications asthma who uses corticosteroids. Result of study This expected can be one reference for study furthermore.

Methods

Study This use method studies prospective and retrospective observational cohorts. Decent results ethics issued by KEPK University 17 August 1945 Jakarta with No. 87/KEPK-UTA45JKT/EC/EXP/02/2024. Retrieval method sample namely purposive sampling. Compliant samples criteria inclusion. Criteria inclusion These include: Patients with confirmed diabetes mellitus type II with complications asthma, age > 18 years, patients who have vaccinated against covid-19, minimum 1 booster vaccine, willing become respondents For involved in study This.

Result and Discussion

Based on results study This obtained amount sample A total of 150 patients were admitted to in criteria inclusion. Study done from January-April 2024 at the Jakarta Teaching Hospital. Obtained results worthy Ethics are managed at KEPK UTA'45 Jakarta.

The research underscores the critical need for meticulous management and monitoring of corticosteroid use, especially among patients with diabetes mellitus. This necessity arises from the well-documented potential of corticosteroids to impact blood glucose levels and exacerbate diabetes. Corticosteroids, while effective for treating asthma, can complicate diabetes management by causing hyperglycemia and potentially leading to more severe diabetic complications if not properly managed.

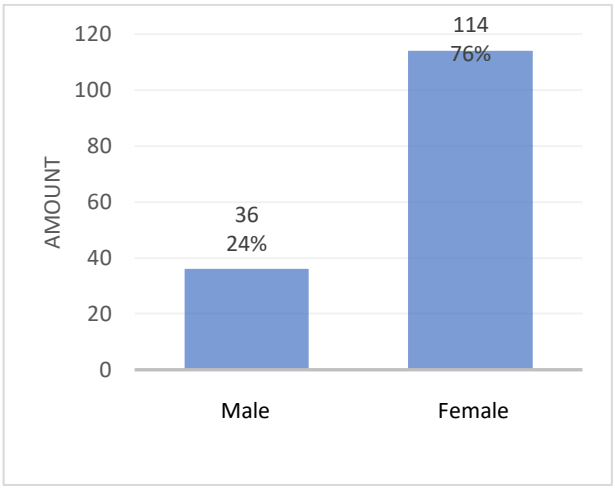

Figure 1. Distribution Patient Sociodemography Based on Gender

Based on Figure 1 is obtained that amount patient Woman namely 114 patients (76%) and men totaling 36 patients (24%).

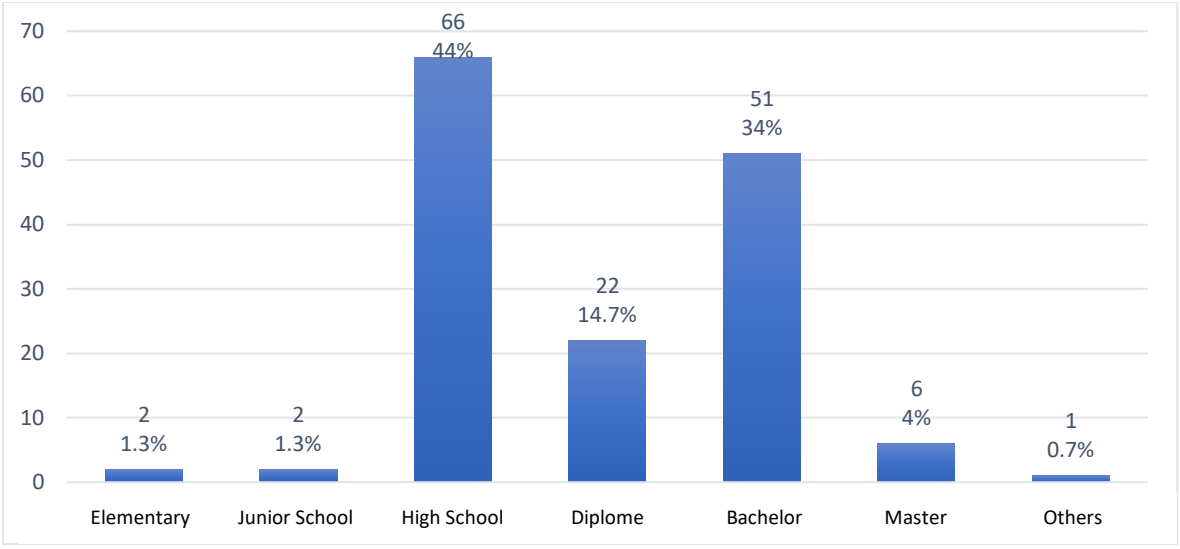

Figure 2. Distribution Patient Sociodemographics Based on Education Level

Based on Figure 2 shows sociodemographic data patient based on level education. Where is the majority patient own level 66 patients (44%) had a high school education, 51 patients had a bachelor's degree (34%), and 22 patients had a diploma (14.7%). Whereas minority patient own level Elementary and junior high school education, namely 2 patients each (1.3%).

Table 1. Prevalence use corticosteroids on treatment asthma with DM incident

Drug Name	Total (N)	Prevalensi
Symbicort	81	27.5%
Seretide Diskus	67	22.7%
Methylprednisolon	134	45.4%
Prednison	10	3.4%
Dexametason	3	1.0%
Total	**295**	**100%**

Based on table 1 is obtained prevalence use corticosteroids that is the most is methylprednisolone amounting to 134 with percentage 45.4%, symbicort 81 (27.5%), seretide disc 67 (22.7%), prednisone 10 (3.4%) and the smallest is dexamethasone 3 (1%).

Table 2. Duration of use corticosteroids in treatment asthma for the average diabetes mellitus patient

Corticosteroid Medication	Duration of Use of Corticosteroid Drugs			Total	%
	≤ 5 Years	6-10 Years	>11 Years		
Symbicort	31	43	6	80	27.2%
Seretide Diskus	31	28	8	67	22.8%
Methylprednisolon	61	67	6	134	45.6%
Prednison	4	2	4	10	3.4%
Dexametason	0	1	2	3	1.0%
Total	**127**	**141**	**26**	**294**	**100%**
%	**43.2%**	**48%**	**8.8%**	**100%**	**100%**

Based on Table 2 shows data on length of use corticosteroids in treatment asthma for the average diabetes mellitus patient that is for 6-10 years as many as 141 cases, then ≤ 5 years 127 cases and > 11 years 26 cases. With long use methylprednisolone 6-10 years amounting to

67 cases. ≤ 5 years 61 cases and > 11 years only 6 cases. While the lowest that is dexamethasone with a period of use ≤ 5 years No There is cases, 6-10 years 1 case and > 11 years 2 cases.

Table 3. Relationship Between Corticosteroid Drugs With Clinical Outcomes

Corticosteroid Medication	Clinical_Outcome		Total	(%)	*p-value
	Living	Dead			
Symbicort	17	0	17	11%	
Seretide Diskus	17	0	17	11%	
Methylprednisolon	46	3	49	33%	
Prednison	61	2	63	42%	0.789
Dexametason	4	0	4	3%	
Total (N)	**145**	**5**	**150**	**100%**	
%	**96.67%**	**3.33%**			

*Chi-square, Fisher Exact Test

Based on table 3 is obtained the results of the chi-square test, Fisher exact, were 0.789 (> 0.005). No There is connection between drug corticosteroids with clinical outcomes.

The sociodemographic data presented in Figures 1 and 2 highlight significant gender and educational disparities among the patients. In Figure 1, the majority of the patients were women, constituting 76%, while men made up only 24% of the sample. This gender imbalance is consistent with findings from previous studies, such as those by Mutmainah & Rahmawati (2010), which indicate a higher prevalence of diabetes mellitus among women. This can happen because women have a greater risk of suffering from diabetes mellitus than men, because physically women have a greater chance of increasing their body mass index with premenstrual syndrome. Post-monopouse makes it easy for the distribution of body fat to accumulate due to hormonal processes, so women are at risk of suffering from diabetes mellitus. Apart from that, more women are obese (Alessi et al., 2020). Men have more muscle mass and use more muscle mass than women due to more activity and burning more calories by muscle than women. Women are more concerned about having their health checked compared to men. Women generally have compliance so that treatment can run well. However, men tend to have higher confidence, be independent, and always have a positive attitude towards their illness. Therefore, men and women generally have the same ability to solve their health problems. (12).

Figure 2 illustrates the educational levels of the patients, revealing that the majority had at least a high school education. Specifically, 44% of the patients had completed high school, 34% held bachelor's degrees, and 14.7% had diplomas. Only a small fraction of the patients had elementary or junior high school education, each representing 1.3% of the sample. This distribution suggests that most patients possess at least a moderate level of education, which could influence their understanding and management of their conditions. The level of education also influences the maturity of a person's personal changes to accept positive external influences related to health information so that easily receiving this information will make it easier for patients to carry out care management. Education is believed to be an important factor in understanding management, compliance with blood sugar control, asthma attacks, overcoming symptoms that appear with appropriate treatment and preventing complications. Education is generally related to knowledge. Patients with higher education have better knowledge about the disease and its effects on health so that sufferers will respond positively and will try (Renzaho et al., 2007). However, even though a person's education is high, it does not guarantee that the experience gained will also be high because this is also influenced by socio-cultural factors which can influence a person to take action based on their experience. Customs, norms, encouragement from people closest to them are one of the factors that make a person make a decision to act.

Based on Table 1. Corticosteroid drugs with prevalence highest is Methylprednisolone, which was used by 45.4% of patients. This shows that almost half from population patient asthma with incident DM uses Methylprednisolone. Symbicort was used by 27.5% of patients, making it drug corticosteroids second most common used in group This. Seretide Diskus, with prevalence of 22.7%, also showed sufficient use tall. Prednisone and Dexamethasone own prevalence remote use more low, namely 3.4% and 1% respectively.

That matter in accordance with research conducted by Ajeng and Widianingtyas (2018) shows that use corticosteroids in HS pharmacies as therapy asthma and as many as 67 patients (83.75%) responded Not yet know that corticosteroids can increase blood sugar levels / causes diabetes mellitus. So that need role pharmacist in give education related use corticosteroids to diabetes mellitus patients.

According to study incident Pangaribuan et.al (2020) The incidence of DM in COPD at Persahabatan Hospital it was found that 21.3% of subjects used it corticosteroids inhalation own control glycemic good-medium. Supported by research by Suissa et al. (2010) that in patients who have disease breathing, use corticosteroids inhalation linked with level severity is happening and happening enhancement risk onset of diabetes and progression of diabetes by 34%. The risks more big occurs at higher doses . Risk will the more increase if dose used high (fluticasone 1000µg/ day) with an RR of 1.64. Use corticosteroids inhalation as therapy in COPD patients with progressiveness of marked DM (RR=1.34). with control poor glycemic and presence change from oral diabetes medication to insulin. Corticosteroids inhalation must considered giving it to the patient asthma with blood sugar levels high, control blood sugar bad as well as found risk progression and complications high (Egbuonu e al. 2014).

Length of use corticosteroids in treatment asthma for the average diabetes mellitus patient ie in line with since beginning diagnosed asthma . Based on Table 2, of the total 294 observations studied , the majority user is at in category use drug for 6-10 years, with a total of 141 patients. Methylprednisolone is most drugs used with a total of 134 users, consisting from 61 users for ≤ 5 years, 67 for 6-10 years, and 6 for more from 11 years. Furthermore use symbicort amounting to 80 patients.

Hwang & Weiss (2014) and Simmons et al. (2012) contribute to this discourse by highlighting that the duration of corticosteroid use plays a significant role in increasing the risk of developing diabetes mellitus. Their research suggests that prolonged corticosteroid therapy can elevate the risk of glucose intolerance and diabetes onset. This is particularly relevant for patients with pre-existing diabetes or those at risk of developing the condition (O'Byrne et al., 2012). Therefore, long-term corticosteroid use necessitates a strategic approach to manage and mitigate its adverse effects on glucose metabolism. Effective strategies might include regular monitoring of blood glucose levels, adjustment of diabetes medications, and patient education on lifestyle modifications to counteract the impact of corticosteroids.

Based on table 3 satisfactorily seen that patients who died use methylprednisolone that is as many as 3 patients, used prednisone namely 2 patients. Then obtained Chi-Square test value, Fisher Exact p value 0.789 ($p > 0.05$) meaning No there is connection between type corticosteroids used with clinical outcomes.

The study's findings that there is no significant association between the types of corticosteroids used and clinical outcomes align with the research by Fatima et al. (2020). Fatima et al. found no substantial differences in clinical outcomes among different corticosteroids, suggesting that the choice of corticosteroid may not be the primary determinant of patient outcomes. This aligns with the current study's observation that variations in corticosteroid types did not significantly impact clinical outcomes such as mortality or disease progression. However, it is crucial to note that while the type of corticosteroid may not influence outcomes significantly, the duration and dosage of corticosteroid therapy remain critical factors to monitor (19).

Conclusion

Based on results research that has been done so can concluded that majority diabetes patients with complications asthma is female 114 patients (76%) of amount patient 150. With level education highest namely SMA in 66 patients (44%). Prevalence use corticosteroids the most is methylprednisolone namely 45.4%. Use corticosteroids to the incidence of diabetes has connection. Length of use corticosteroids biggest namely 6-10 years as many as 141 patients. There is n't any significant relationship between type corticosteroids with clinical outcomes.

References

Alessi, J., De Oliveira, G. B., Schaan, B. D., & Telo, G. H. (2020). Dexamethasone in the era of COVID-19: friend or foe? An essay on the effects of dexamethasone and the potential risks of its inadvertent use in patients with diabetes. *Diabetology & Metabolic Syndrome*, *12*(1), 1–Retrieved 22 June 2023 from https://doi.org/10.1186/S13098-020-00583-7.

Das, M., Sontakke, T., Acharya, S., & Shukla, S. (2020). Pattern of change in blood glucose level in hospitalized patient treated with inhaled corticosteroid. *Medical Science*, *24*(103), 1122-1127.

Egbuonu, F., Antonio, F. A., & Edavalath, M. (2014). Effect of inhaled corticosteroids on glycemic status. *The open respiratory medicine journal*, *8*, 101. https://doi.org/10.2174/1874306401408010101

Fatima, S. A., Asif, M., Khan, K. A., Siddique, N., & Khan, A. Z. (2020). Comparison of efficacy of dexamethasone and methylprednisolone in moderate to severe covid 19 disease. *Annals of Medicine and Surgery (2012)*, *60*, 413–416. Retrieved 22 June 2023 from https://doi.org/10.1016/J.AMSU.2020.11.027

Handayani, R., & Suraya, I. (2020). Determinan Kejadian Diabetes Melitus Tipe 2 di Posbindu Mawar Kuning Gambir. *ARKESMAS (Arsip Kesehatan Masyarakat)*, *5*(1), 42-48.

Hou, A. A., Langi, F. L. F. G., & Kandou, G. D. (2022). Studi Ekologi : Hubungan Antara Prevalensi Diabetes Melitus dengan Asma di Indonesia. *Jurnal Lentera - Penelitian Dan Pengabdian Masyarakat*, *3*(1), 05–10. https://doi.org/10.57207/lentera.v3i1.14.

Hwang, J. L., & Weiss, R. E. (2014). Steroid-induced diabetes: a clinical and molecular approach to understanding and treatment. *National Institute of Health*, *141*(3), 457–458. https://doi.org/10.1176/ajp.141.3.457

Mutmainah, N., & Rahmawati, M. (2010). Hubungan antara kepatuhan penggunaan obat dan keberhasilan terapi pada pasien hipertensi di rumah sakit daerah Surakarta tahun 2010. *Pharmacon: Jurnal Farmasi Indonesia*, *11*(2), 51-56. https://doi.org/10.23917/pharmacon.v11i2.55

O'Byrne, P. M., Rennard, S., Gerstein, H., Radner, F., Peterson, S., Lindberg, B., Carlsson, L. G., & Sin, D. D. (2012). Risk of new onset diabetes mellitus in patients with asthma or COPD taking inhaled corticosteroids. *Respiratory Medicine*, *106*(11), 1487–1493. https://doi.org/10.1016/j.rmed.2012.07.011.

Pangaribuan, M., Yunus, F., Damayanti, T., & Rochsismandoko. (2020). Prevalens Diabetes Melitus Pada Pasien Penyakit Paru Obstruktif Kronik. *Jurnal Respirologi Indonesia*, *40*(1), 43–52.

Renzaho, A. M., Woods, P. V., Ackumey, M. M., Harvey, S. K., & Kotin, J. (2007). Community-based study on knowledge, attitude and practice on the mode of transmission, prevention and treatment of the Buruli ulcer in Ga West District, Ghana. *Tropical Medicine & International Health*, *12*(3), 445-458.

Serebrisky, D., & Wiznia, A. (2019). Pediatric asthma: a global epidemic. *Annals of global Health*, *85*(1).

Simmons, L. R., Molyneaux, L., Yue, D. K., & Chua, E. L. (2012). Steroid-Induced Diabetes: Is It Just Unmasking of Type 2 Diabetes? *ISRN Endocrinology*, *2012*, 1–5. https://doi.org/10.5402/2012/910905

Suissa, S., Kezouh, A., & Ernst, P. (2010). Inhaled corticosteroids and the risks of diabetes onset and progression. *American Journal of Medicine*, *123*(11), 1001–1006. https://doi.org/10.1016/j.amjmed.2010.06.019

Wu, T. D. (2021). Diabetes, insulin resistance, and asthma: A review of potential links. *Current Opinion in Pulmonary Medicine*, *27*(1), 29–36. https://doi.org/10.1097/MCP.0000000000000738