

Association between Xerosis and Severity of Pruritus in Patients with Chronic Renal Failure Undergoing Hemodialysis at Dr. Mohammad Hoesin (RSMH) General Hospital Palembang, Indonesia

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Abstract: Chronic renal failure (CRF) is a disease that affected many people and had become a global epidemic. Xerosis and pruritus are the most common cutaneous manifestation in patients with CRF undergoing hemodialysis. Xerosis allegedly play a role in the pathogenesis of pruritus. The aim of this research was to analyze the association between xerosis and severity of pruritus. This research was an observational analytic study with cross-sectional design conducted in Hemodialysis Installation (HI) of RSMH Palembang. The research subjects were 81 patients with CRF undergoing hemodialysis period September-November 2016. The assessment consists of: evaluation of pruritus by using interviews, severity of pruritus was measured by using visual analog scale (VAS), xerosis was assessed by physical examination, severity of xerosis was measured by body surface area (BSA) affected. The data were processed using application of computer for which $p < 0,05$ were accepted as significant. From 81 subjects research, xerosis were observed in 69,1%, pruritus in 61,7%. There was association between xerosis and pruritus ($PR = 4,86$; $p = 0,003$) and severity of xerosis and pruritus ($PR = 8,09$; $p = 0,005$). There was no association between xerosis and severity of pruritus ($PR = 3,600$; $p = 0,144$). There was significant association between xerosis and pruritus but not with the severity of pruritus; and significant association between the severity of xerosis and pruritus. Patient with xerosis had five times higher possibility suffer from pruritus. Patient with moderate until severe xerosis had eight times higher possibility suffer from pruritus.

1 INTRODUCTION

Chronic renal failure (CRF) is a syndrome characterized by progressive and irreversible kidney function loss with a diverse etiology. This disease is one of the most common chronic diseases and has become a global epidemic and the incidence rate is increasing worldwide developed countries and developing countries. (Peres, 2014) It is estimated that more than 50 million people worldwide experience CRF and 1 million of them require renal replacement therapy. Data show that cases of chronic

renal failure are mostly diagnosed in the late stages with a high rate of morbidity and mortality. This is largely due to poor screening and treatment programs of disease causes. CRF is caused by a diverse etiology and in Indonesia glomerulonephritis disease is still a major cause of chronic renal failure in the past few decades even in the United States it is reported that diabetes mellitus is ranked first. (Suwitra, 2014) Chronic renal failure affects and manifests to many systems such as the nervous system, gastrointestinal, cardiovascular, hematologic, endocrine and skin. (OnelmisSener, 2012)

In relation to the skin system, in end-stage CRF patients 50-100% have at least one cutaneous manifestation. This manifestation is very diverse and can be obtained both before and after initiating dialysis. This manifestation may be divided into specific cutaneous manifestations such as calciphylaxis, bullous dermatosis, acquired perforating dermatosis and manifestations non-specific cutaneous ones such as pruritus, xerosis and pigmentation. (Masmoudi, 2014) Pruritus and xerosis are the most common manifestations in patients with CRF and are more common in patients undergoing hemodialysis than peritoneal dialysis. (Manetil, 2009) These two manifestations can be obtained in varying degrees of chronic renal failure. In several case series studies it was reported that the prevalence of xerosis in patients with CRF undergoing hemodialysis between 23-79% and for pruritus between 36-57%. This prevalence may increase with increasing degrees of CRF. (Khanna, 2010) Although this is not life-threatening but may affect the quality of life and tends to make the patient anxious and depressed as each symptom increases. (Szepletowski, 2011)

In some studies conducted by Khanna et al. Thomas et al., that was a significant relationship between xerosis and pruritus. (Khanna, 2010) (Thomas, 2012). Onelms et al. (2012) also suggested a significant association between the severity of xerosis, especially severe xerosis with pruritus events. This suggests that xerosis plays a role in the pathogenesis of pruritus.³ In the Peres et al (2014) study also stated that xerosis plays a role in the occurrence of pruritus in patients with chronic renal failure. The symptoms of pruritus in patients with CRF are generally found to vary from mild to severe, which can interfere with sleep and even daily activities. Pruritus is also often found to provide secondary manifestations of the skin due to strong and repeated scratching such as excoriation, chronic lichen simplex, prurigo nodularis, acquired perforating dermatosis.¹ Research on the relationship between xerosis and severity of pruritus is still low and in RSMH Palembang has never been done. Therefore, researchers want to do research to determine the relationship between xerosis and severity of pruritus in patients with chronic renal failure who underwent hemodialysis at RSMH Palembang.

2 METHODS

Observational analytic research with cross sectional approach was undertaken in October to November 2016 at Hemodialysis Installation of RSMH Palembang. There were 81 patients with chronic renal failure who undergoing hemodialysis who fulfilled the inclusion and exclusion criteria. The inclusion criteria in this study included CRF patients undergoing hemodialysis from September to November 2016 and who signed informed consent. Exclusion criteria included patients with accompanying hepatitis, HIV, and cancer, patients with other skin diseases, patients who had taken oral antihistamine drugs 2 days before the examination and who had been using emollient moisturizing therapy 3 weeks prior to the examination. The protocol has been approved of Ethic Committee, Faculty of Medicine Sriwijaya University.

Pruritus events are known by interviewing patients, the severity of pruritus is measured by using Visual Analogue Scale (VAS). The incidence of xerosis is obtained by performing a physical examination and the severity of xerosis is measured by looking at the affected Body Surface Area (BSA). The analysis was performed by statistical test Comparative analysis using Chi-square test or Fisher's exact test on computer program to know the relationship between xerosis and pruritus, xerosis and severity of pruritus, severity of xerosis and pruritus.

3 RESULTS

Table 1 shows that of the 81 respondents (22.2%) are the age group of 44-51 years and the least (4.9%) in the 20-27 age group. Male respondents (54.3%) more than female respondents (45.7%) and the majority of respondents (51.9%) did not work. Respondents who work as laborers/farmers and ABRI/PNS have the same proportion of 12.3%, while the rest (23.5%) work as self/private employees.

Table 1. Distribution of Respondents Based on Sociodemographic Characteristics.

Characteristics	Total	Percentage (%)
Age (years)		
• 20-27	4	4.9
• 28-35	6	7.4
• 36-43	13	16.1
• 44-51	18	22.2
• 52-59	17	21.0
• 60-67	16	19.8
• 68-75	7	8.6
Sex		
• Male	44	54.3
• Female	37	45.7
Occupation		
• Laborers/Farmers	10	12.3
• ABRI/PNS	10	12.3
• Self/Private Employees	19	23.5
• Not Work	42	51.9

(Primary Data, 2016)

In this study an analysis was conducted to determine the relationship between xerosis and pruritus by using Chi-Square test. The results showed that there was a statistically significant relationship

between xerosis and pruritus (PR = 4.86; p = 0.003). This means that respondents with xerosis are 5 times more likely to have pruritus.

Table 2. Relationship Between Xerosis and Pruritus (n=81).

Characteristic	Pruritus		Total	PR* (CI 95%)	p value*
	Yes	No			
Xerosis					
• Yes	41	15	56	4.859 (1.773-13.319)	0.003
• No	9	16	25		
Total	50	31	81		

(Chi-Square Test, pvalue = 0.05)

Table 3. Relationship Between Xerosis and Severity of Pruritus (n=50).

Characteristic	Pruritus Severity		Total	PR* (CI 95%)	p value*
	Moderate-Severe	Mild			
Xerosis					
• Yes	36	5	41	3.600 (0.676-19.163)	0.144
• No	6	3	9		
Total	42	8	50		

(Fisher Exact Test, p value = 0.05)

In addition, by statistical analysis using Fisher's exact test results obtained no significant relationship between xerosis and severity of pruritus (PR = 3.600; p = 0.144).

Fisher's exact test was performed to determine the relationship between the severity of xerosis and

pruritus, and there was a significant correlation between the severity of xerosis and pruritus (PR = 8.094 ; p = 0.005) which means that respondents who had moderate and severe xerosis were 8 times more likely to have pruritus.

Table 4. Relationship Between Severity of Xerosis and Pruritus (n=56).

Characteristic	Pruritus		Total	PR* (CI 95%)	p value*
	Yes	No			
Xerosis Severity					
• Moderate -Severe	37	8	45	8.094 (1.905- 34.393)	0.005
• Mild	4	7	11		
Total	41	15	56		

(Fisher Exact Test, p value = 0.05)

4 DISCUSSION

In this research note that respondents who experienced pruritus at most respondents had xerosis. The number of respondents who experienced pruritus with xerosis were 41 respondents (73.2%). In previous studies, the proportion of pruritus was greater in the respondents with xerosis.8 This is consistent with the theory that xerosis plays a role in the occurrence of pruritus in patients with chronic renal failure. (Peres, 2014)

Several studies have reported that elevated serum phosphorus levels and calcium levels contribute to the pathogenesis of pruritus. It was considered because it has been an increase in the concentration of divalent ions in the skin which then causes mikropresipitasi calcium or magnesium phosphate which can be a cause of pruritus.Hyperparathyroidism, iron deficiency anemia, xerosis also reported to contribute to the cause pruritus. (OnelmisSener, 2012) Many factors are involved in the pathogenesis of pruritus such as secondary hyperparathyroidism, xerosis, increased levels of calcium, magnesium, phosphorus, serum histamine, hipervitaminosis A. pruritus in patients with chronic renal failure caused by the accumulation of slow metabolic processes or hormonal imbalances in the body. (Thomas, 2012)

The results showed a very significant relationship between xerosis and pruritus (PR = 4.859; p = 0.003). Patients with chronic renal failure with xerosis have 5 times higher probability to experience pruritus compared with patients without xerosis. Xerosis contributes to the pathogenesis of pruritus. Impaired skin barrier function in the form of

decreasing water content in the stratum corneum facilitates incoming irritants that can trigger or trigger the occurrence of pruritus and can initiate an inflammatory response. (Yosipovitch, 2004).Xerosis in patients with chronic renal failure may reduce the threshold of pruritus, thus facilitating other factors to trigger the itch. (Zucker, 2003)

that, in response to the low humidity environment there will be increased and degranulation of mast cells and histamine levels in the epidermis. Pruritus in patients with xerosis has been associated with abnormal function of nerve fibers in the epidermis and papilla dermis. (Peres, 2014)

The results showed that there was a very significant relationship between the severity of xerosis and pruritus (PR = 8.094; p = 0.005). Patients with chronic renal failure with moderate to severe xerosis are 8 times more likely to have pruritus than patients with mild xerosis. This is in accordance with the results of previous studies conducted by Khanna et al. (2012) and Onelmis et al. (2012) indicating that the severity of xerosis was significantly significant as a pruritus risk factor. (OnelmisSener,2012) (Khanna,2010)

5 CONCLUSIONS

From this research can be concluded there is a very meaningful relationship between xerosis and pruritus and the severity of xerosis and pruritus. However, there is no association between xerosis and the severity of pruritus. Patients with chronic renal failure who undergo hemodialysis and having xerosis are 5 times more likely to have pruritus and those with

moderate to severe xerosis may be 8 times higher for pruritus.

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