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Prevalence and Associated Factors of Urinary Incontinence among Elderly in Pekanbaru, Indonesia

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Abstract

Background: The proportion of the elderly in Riau Province was 4.8% higher than that (4.2%) in 2011. Urinary incontinence (UI) is a common health problem among the elderly. This study aims to determine the prevalence and associated factors for UI among the elderly (≥60 years).

Methods: This cross-sectional study was conducted in 20 public health centers in Pekanbaru City in 2018. A total of 351 elderly meeting the inclusion criteria were enrolled. Gender, age, education, occupation, marital status, obesity, depression, cognitive impairment, smoking status, history of chronic cough, and history of lower abdominal surgery served as the independent variables and UI as the dependent variable. Data were collected through interviews facilitated by staff trained by the research team. Data were analyzed using multiple logistic regression with a predictive factor model to assess the relationship between the independent and dependent variables.

Results: The prevalence of UI was 6%, and the associated factors were chronic cough (prevalence odds ratio = 17.661; 95% CI: 6.380–48.884). Gender, age, education, and lower abdominal surgery were the confounding factors.

Conclusions: Health workers at the public health center of Pekanbaru should educate the community and the elderly about the potential causes, prevention, and treatment of UI.

Keywords: elderly, urinary incontinence, Indonesia

INTRODUCTION

Urinary incontinence (UI) is an important health problem that needs attention. The reported prevalence of UI from several countries ranges from 5% to 70%, specifically 22.9% (28% in women and 16.1% in men) in Sao Paulo, Brazil in 2016[1] and 37.2% in Turkey.[2] In addition, most studies reported a prevalence of around 25%–45%. UI is highly prevalent among the elderly.[3] UI prevalence is likely to increase in the United States. In 1998, 2004, and 2008, the incidence of UI increased by 19.8%, 23.6%, and 27.5%, respectively.[4]

The epidemiology of UI in Indonesia is usually undocumented because incontinence is generally a part of other diseases; stress incontinence is commonly found.[5] Sumardi conducted a survey of UI in Nationwide Indonesia from 2008 to 2011 and found that the overall prevalence of UI was 13%.[6] Rijal found a UI prevalence of 34.2% among women in nursing homes, with 70.5%, 17.9%, and 11.6% of mixed UI (MUI), stress UI (SUI), and urgency UI (UUI), respectively.[7] Farid conducted a study at the Gynecology Polyclinic of Cipto Mangunkusumo Hospital and obtained prevalence rates of 4.3%, 3.0%, and 2.7% for SUI, UUI, and MUI, respectively.[8]

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Risk factors for UI include old age (>60 years), menopause >10 years, multiparity, connective tissue disorders, diabetes mellitus, vitamin D deficiency, prolonged increase in intra-abdominal pressure (chronic constipation and chronic cough), neurological disorders (Parkinson's disease; cerebrovascular disease; multiple sclerosis; and cognitive impairment), mobility disorders, lower abdominal surgery, urological surgery, obesity, and smoking.[5,7,8]

An elderly is one who has reached the age of 60 years and over. The elderly population increases annually. In 1980, The Coordinating Ministry for Public Welfare (*Kemenko Kesra*) reported a life expectancy of 52.2 years and an elderly population of 7,998,543 (5.45%). Meanwhile, in 2006, the number of elderly people increased to 19 million (8.90%) with a life expectancy of 66.2 years. In 2010, the estimated number of elderly people was 23.9 million or 9.77%, and life expectancy increases to 67.4 years. In 2020, the elderly population was estimated to be 28.8 million or 11.34% and the life expectancy was 71.1 years.[9] On the basis of Human Development Report 2011, the life expectancy of Indonesians is 69.4 years old.[10]

Data and Information Center, Ministry of Health RI in 2015 informed the distribution of the elderly population by province. DI Yogyakarta Province is in the first position with an elderly population percentage of 13.4%, and the lowest is Papua Province (2.8%). Meanwhile, the

percentage of the elderly population in Riau Province was 4.8%.[11] Statistic Indonesia data show that the proportion of the population aged >65 years old increased from 2011 to 2015. The percentage of the elderly population in 2011 was 4.2%, lower than that (4.8%) in 2015.[12]

UI decreases the quality of life and increases the loneliness of the elderly. Previous study found that depression and UI reduce the quality of life.[13] When both occur, other effects appear and affect physical and mental health.[13] Other study reported that UI increases the loneliness of the elderly.[14] UI data in Indonesia are unrecorded and limited to certain areas. Existing data cannot represent the prevalence of UI in old age in Pekanbaru City, Riau Province. Therefore, data on the prevalence and risk factors for UI in Pekanbaru City, Riau Province must be obtained. This study aimed to determine the prevalence and risk factors for UI in old age in Pekanbaru City, Riau Province.

METHODS

This study used a cross-sectional design and was conducted at 20 Puskesmas in Pekanbaru City during March–August 2018 in Riau Province. The study was approved by the ethical clearance committee of the Faculty of Medicine, University of Riau (No: 058 / UN.19.5.1.1.8 / UEPKK / 2018, date of issue: March 16, 2018).

Elderly in Pekanbaru City, Riau Province who met the inclusion criteria (351 elderly) were enrolled in this study. The sample size was determined using a survey sample size calculation (P = 21,5%; α = 5%; 95% CI; a precision (d) of 5%). The inclusion criteria were age ≥60 years, had no serious illness that prevented the interview, and willingness to participate in the study. The exclusion criteria were elderly with motor aphasia, illiteracy, and dementia.

The dependent variable was UI, which was defined on a self-report containing a "yes" or "no" response if the participant experienced UI.[15] The independent variables were gender, age, education, occupation, marital status, obesity (BMI >27 kg/m^2), depression (Geriatric Depression Scale [GDS] ≥10),[16] cognitive disorders (Mini-Mental State Examination [MMSE] score is <20),[17] smoking status, history of chronic cough (cough lasting for eight weeks or more before experienced UI), and a history of lower abdominal surgery.

Purposive sampling was performed, and the participation rate was 100%. Data were collected through interviews facilitated by staff previously trained by the research team. The number of trained interviewers who conducted interviews was 20.

A standardized questionnaire was the study instrument used. Depression was assessed using the GDS, an instrument designed to measure depression without inflating the score because of somatic complaints associated with normal aging. The GDS is a well-validated tool for measuring depressive symptoms and is well suited for measuring subclinical changes in depressive symptoms; tools focused on diagnostic thresholds may result in underreporting depressive symptoms in older adults.[16] Cognitive status was assessed with the MMSE, which is the most widely used screening test for cognitive impairment. The MMSE allows the quantification of cognitive abilities and their changes over time and has good reliability (Sensitivity = 87%; Specificity = 82%). The total MMSE combines scores from five cognitive domains (orientation, language and comprehension, memory, attention/calculation, and praxis), where each domain is assigned a weight that is approximately equal to the overall score.[18] However, the MMSE has less specificity in the non-White group.[19] Obesity was assessed using the BMI, obtained by measuring the weight/height (kg/m^2). BMI was measured using the height and weight scales of SECA brand.

Data analysis was performed by bivariate with chi-square test. A multivariate test was used to assess the relationship between independent and dependent variables through multiple logistic regression with predictive factor models. Data are presented in tabular form. Data were analyzed using SPSS statistical software 19.0.

RESULTS

The largest number of elderly was in the age group 60–66 years (54.1%), female (69.2%), educational status of elementary school (34.2%), married (58.7%), and elderly with unemployment status (79.2%) (Table 1). Table 1 also shows the number of elderly who experience UI and the distribution of associated factors. The UI prevalence was 21 (6.0%). The distribution of risk factors was smoking status (21.7%), elderly with chronic cough (10.8%), elderly with a history of lower abdominal surgery (8.8%), obesity (16.8%), depression (3.4%), and cognitive impairment (14.8%).

Table 2 shows that only a history of chronic cough is associated with UI. Gender, age, education, occupation, marital status, obesity, depression, cognitive impairment, smoking status, and a history of lower abdominal surgery showed no significant relationship with $p > 0.05$. Of the 38 elderly who had chronic cough, 12 (57.1%) elderly experienced incontinence. Statistical test results obtained $p < 0.05$, indicating a significant relationship between a history of chronic cough and incontinence.

TABLE 1. Elderly characteristics and distribution of urinary incontinence and associated factors for the elderly in Pekanbaru City

Variables	N	(%)
Age (Years old)		
≥ 67	161	45.9
60–66	190	54.1
Gender		
Male	108	30.8
Female	243	69.2
Educational status		
No formal education	35	10.0
Elementary school	120	34.2
Junior High school	81	23.1
Senior High school	81	23.1
Diploma	12	3.4
Bachelor Degree	20	5.7
Master Degree	2	0.6
Marital status		
Married	206	58.7
Divorced/widowed	144	41.0
Single	1	0.3
Employment status		
No	278	79.2
Yes	73	20.8
Urinary incontinence		
No	330	94.0
Yes	21	6.0
Smoking		
No	275	78.3
Yes	76	21.7
Chronic cough		
No	313	89.2
Yes	38	10.8
History of lower abdominal surgery		
No	320	91.2
Yes	31	8.8
Obesity		
No	292	83.2
Yes	59	16.8
Depression		
No	339	96.6
Yes	12	3.4
Cognitive status		
No	299	85.2
Yes	52	14.8
Total	351	100

Statistical test results showed that the prevalence odds ratio (POR) was 15.590 (95% CI: 6.014–40.413). This result indicates that the elderly with a history of cough had a 15.590 times risk of experiencing UI than the elderly without chronic cough. A $p < 0.25$ indicates that the variable is involved in multivariate modeling. The results of bivariate selection showed that several variables produced $p < 0.25$. Gender, age, educational status, marital status, obesity, cognitive impairment, smoking status, and history of lower abdominal surgery ($p \geq 0.25$) are involved in multivariate modeling because those variables related to UI in theory.

Multivariate modeling was performed on candidate variables. Candidate variables included in the multivariate analysis were all tested independent variables. Confounding tests were also carried out at this stage. Each variable with the largest p-value was excluded from the model until no $p > 0.05$ was found. Statistically, variables with a change in POR value > 10% are defined as confounding variables. Then, the confounding variables were still included in the multivariate modeling. Table 3 shows the final model of multivariate analysis. Gender, age, education, and history of lower abdominal surgery were confounding.

Table 3 shows that gender, age, education, and lower abdominal surgery were the confounding variables. The POR value changed before and after the variable was released by >10%. Then, these variables were included again into modeling. Multivariate analysis showed that the variable significantly associated with UI was chronic coughing. Gender, age, education, and lower abdominal surgery were the confounding variables. Results showed that the POR value of chronic cough was 17.661. Thus, the participants who had chronic cough had a 17.661 times higher risk of UI than the participants who did not have chronic cough after being controlled by variables of gender, age, education, and lower abdominal surgery.

DISCUSSION

According to The International Continence Society, UI is a condition where urine discharge is uncontrolled.[20] UI is the inability to control urine output through the bladder.[21] Several types of UI include SUI, UUI, overflow urinary incontinence (OUI), MUI, and functional urinary incontinence (FUI).[22] SUI is related to a weakening of the pelvic floor muscles because of excessive exercise or activity, persistent coughing, constipation, injury to the pelvic area due to accidents, complications involving the pelvic floor or urethra, effects of childbirth, or problems with the spinal lining back down.[23]

UUI is the inability to delay UI after the bladder is filled. This type of incontinence is caused by detrusor hyperactivity, dementia, stroke, and Parkinson's disease. MUI is a combination of SUI and UUI. FUI is urine excretion associated with cognitive disabilities and/or physical, psychological, or environmental functions. It is caused by severe dementia or other neurological disorders and depression. OUI is leakage of urine in small amounts, resulting either from mechanical forces in the bladder or from other causes that affect urinary retention in the bladder. It is generally associated with diabetes mellitus, multiple sclerosis, or the influence of drugs.[22]

TABLE 2. Factors associated with urinary incontinence in the elderly in Pekanbaru City

Variables	Urinary incontinence						p^a	POR (95% CI)
	No		Yes		Total			
	N	(%)	N	(%)	N	(%)		
Gender								
Male	102	30.9	6	28.6	108	30.8	0.822	1.118 (0.422–2.965)
Female	228	69.1	15	71.4	243	69.2		
Age (Years old)								
60–66	181	54.8	9	42.9	190	54.1	0.285	1.620 (0.664–3.948)
≥ 67	149	45.2	12	57.1	161	45.9		
Educational status								
Diploma, bachelor, master	31	9.4	3	14.3	34	9.7	0.721	0.750 (0.155–3.632)
Elementary, junior & senior high	268	81.2	14	66.7	282	80.3	0.130	0.405 (0.125–1.307)
No formal education	31	9.4	4	19.0	35	10.0	-	1
Employment status								
Yes	69	20.9	4	19.0	73	20.8	1.000	1.124 (0.366–3.447)
No	261	79.1	17	81.0	278	79.2		
Marital status								
Married	194	58.8	12	57.1	206	58.7	0.882	1.070 (0.439–2.609)
Divorced/widowed/single	136	41.2	9	42.9	145	41.3		
Obesity								
No obesity	275	83.3	17	81.0	292	83.2	0.764	1.176 (0.381–3.631)
Obesity	55	16.7	4	19.0	59	16.8		
Depression								
No	320	97.0	19	90.5	339	96.0	0.157	3.368 (0.689–16.471)
Yes	10	3.0	2	9.5	12	3.4		
Cognitif impairment								
No	282	85.5	17	81.0	299	85.2	0.531	1.382 (0.446–4.285)
Yes	48	14.5	4	19.0	52	14.8		
Smoking status								
No	259	78.5	16	76.2	276	78.3	0.805	1.140 (0.404–3.219)
Yes	71	21.5	5	23.8	76	21.7		
Chronic cough								
No	304	92.1	9	42.9	313	89.2	<0.005*	15.590 (6.014–40.413)
Yes	26	7.9	12	57.1	38	10.8		
History of lower abdominal surgery								
No	302	91.5	18	85.7	320	91.2	0.415	1.798 (0.499–6.479)
Yes	28	8.5	3	14.3	31	8.8		

*Significant at $p < 0.05$; [a]Chi-square test.

TABLE 3. Predictors of urine incontinence by the Multiple Regression Logistic test

Variables	OR	95%CI	p^a
Gender	1.833	0.596–5.642	0.290
Age	1.326	0.483–3.641	0.584
Educational stage (1)	0.587	0.087–3.964	0.585
Educational stage (2)	0.372	0.096–1.443	0.153
Chronic cough	17.661	6.380–48.884	<0.005*
Lower abdominal surgery	2.341	0.515–10.644	0.271

*Significant at $p < 0.05$; [a]Multiple logistic regression test.

UI generally affects women of all ages. Family history, physical exercise/exercise, and several tests can serve as guidelines for physicians to diagnose UI.[24] Incontinence is divided into several types, namely, SUI, UUI, and continuous UI.[25] SUI is described as urine leaking/leakage due to physical activity that increases intra-abdominal pressure, such as prolonged coughing, sneezing, bending over, and some other physical exercise. SUI generally develops in women after childbirth possibly because of pressure denervation from the pelvic floor. Obesity can worsen UI symptoms. The right diet can improve this condition. UUI is defined as leakage of urine, which is preceded by an urgent urge to urinate. It occurs due to spinal trauma or spinal cord abnormalities, leading to the development of a neuropathic bladder. [24,25]

Continuous urinary incontinence occurs day and night continuously. Thirugnanasothy (2010) classified UI into five types (SUI, UUI, MUI, OUI, and FUI). MUI is the seepage associated with emergency, effort/grazing, sneezing, or coughing. Overflow incontinence is a leak due to bladder flow obstruction caused by other causes,

resulting in a large post-volume residual volume emptying.[26] FUI results from the inability to reach or use the toilet on time (for example, immobility and cognitive impairment).[26]

The prevalence of incontinence in this study was 6%, which is lower than that in Indonesia from 2008 to 2011 (13%).[6] Meanwhile, the prevalence of UI in Turkey was 21.5% (56.6% SUI; 25.6% UUI; 17.8% MUI).[27] In Sri Lanka, 23.3% of respondents experienced SUI.[28] In Jeddah, the prevalence of UI was 41.4% (95% CI: 36.6–46.5). SUI (36.4%) is more common than UUI (27.4%) and MUI (22.2%).[29] In Ghana, the prevalence was admitted at 12%.[30] Differences in the use of definitions, the diversity of the study population, and the population sampling procedure resulted in wide differences in reporting UI prevalence.[3]

The risk factors of UI were pregnancy and birth, BMI, genetics and family history, contraception, physical function, diabetes, hysterectomy, dementia and cognitive dysfunction, smoking, caffeine, constipation, urinary tract infections, depression, and exercise.[24] A study conducted in Turkey found that age 40–65 years (OR 1.95; 95% CI, 1.2–3.13), birth (OR 2.20; 95% CI, 1.27–3.78), and urinary tract infection (OR 3.66; 95% CI, 2.20–5.99) are associated with UI.[27] Al-Badr (2012) reported that risk factors of UI include an increase in age/age, parity more than 5, menopause, history of vaginal gynecological surgery, chronic cough, and constipation.[29] Kılıç (2016) found that UI is significantly associated with the number of children, genital disorders, birth duration more than 24 h, diabetes, and urogenital tract infections.[2]

The present study shows that the elderly who have had chronic cough are more associated with UI than the elderly who have never had chronic cough. The results of the study obtained a POR value of 17.661 and a $p <$ 0.005. A statistical relationship was found between the elderly who had chronic cough history and UI in the elderly in Pekanbaru City after being controlled by gender, age, education, and lower abdominal surgery.

Research conducted in China found that women with respiratory problems (chronic cough) are associated with an increased incidence of UI by 2.67 times greater with a $p < 0.01$ and 95% CI: 2.19–3.27.[31] A study in Jeddah also showed the same results that women with risk factors for chronic cough have a 3.4 times chance of experiencing urinary UI with a value of $p = 0.002$ and 95% CI: 1.6–7.9.[29] In line with the research conducted in Sri Lanka, an association was found between chronic cough and an increased incidence of UI. This result may be ascribed to the fact that chronic cough produces high pressure on the stomach, which often causes fatigue of the pelvic floor muscles and other supporting mechanisms.[28,30,32] Problems in the respiratory tract, especially chronic coughs, cause repeated increases in intra-abdominal pressure and result in excessive pelvic floor load.[1] Health professionals should pay attention to the medical condition of the patient, especially those associated with cough, which can increase the risk of UI, to provide the appropriate treatment. Treating the causes of chronic cough is beneficial for women with incontinence.[33]

SUI can be treated in several ways, including weight loss, pelvic floor muscle training, or surgery.[25,26] Treatment of UUI in men and women involves bladder training. The goal of this treatment is to re-establish bladder control and increase bladder capacity. If traditional methods are insufficient, then surgery can be considered by injecting botulinum toxin A into the bladder. Mixed incontinence treatment is directed at predominant symptoms but may involve a combination approach.[26]

Limitations of this study include data sources, study design, and bias in research. Data sources were obtained from the community where elderly UI is determined only through personal interviews without going through the respondent's medical history. Thus, information bias may be introduced either by the interviewer or the respondent. Questions about smoking status and a history of chronic cough could exert potential recall bias because the respondents were required to recall their experiences before UI. Researchers used community-based primary data in Pekanbaru City, which was conducted in May–August 2018. The study design was cross-sectional, where the exposure and outcomes were taken at the same time to describe the magnitude of public health problems. The outcome is the prevalence cases where the disease incidence was present at the time of data collection, but the duration of the disease was unknown. The advantages of the design are practical and useful for predicting the magnitude of health problems in the elderly and provision of abundant information and data, such as an overview of elderly health problems and their risk factors. However, its weakness is that it cannot describe the causal relationship of risk factors with the incidence of health problems in the elderly. No clear temporal relationship can be established if the sample size is small.[34] Determining the causal relationship usually begins with determining the exposure as the cause and then conducting a follow-up to monitor the progress of the outcome. The temporal relationship whether the risk factors predate health problems in the elderly or vice versa remains warrants further analysis.

CONCLUSIONS

The prevalence of UI was 6%. The associated factor was chronic cough. Health professionals at the Public Health Center Kota Pekanbaru should educate the community in the work area about the potential causes, prevention, and treatment of UI. They should also pay attention to

elderly ≥60 years old who have chronic cough by considering confounding factors, such as gender, age, education, and a history of having lower abdominal surgery and working with the Pekanbaru City health office regarding risk factors for UI in the elderly as a priority for handling elderly problems in the community.

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CONFLICT OF INTEREST

The authors have no conflict of interest.

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