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Original Research

Association of socioeconomic status with the incidence rate of peritonitis in patients with Continuous Ambulatory Peritoneal Dialysis (CAPD)

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***ABSTRACT*:**
Background-Patients with low individual income had the next prevalence of peritonitis than other patients, patients with low individual income had significantly poorer nutritional status and bioclinical factors that includes low hemoglobin and altered albumin in comparison to the opposite patient. Multivariable Cox regression models are wont to adjust for potential confounding factors, bias should be unavoidable. Previous literature of the association between socioeconomic status (SES) and risk factors of peritonitis haven't used propensity score matching analysis to induce the results. **Aims and Objectives-** to evaluate the association of socioeconomic status with the incidence rate of peritonitis in patients with CAPD. **Materials and Methods-**The income according to the income tax returns will used to classify the subjects. A sample size of 155 produces a two-sided 90% confidence interval with a width equal to 0.200 when the sample correlation is 0.500. Hence a total of one hundred (155) patients on CAPD and APD will be recruited. **Results-** The frequency and percentage of subjects according to the gender, age in group, socio-economic status group score 2 high socio-economic status group, and score 3 upper middle socio-economic status group, diagnosis criteria, CAPD/APD, peritonitis, catheter removal and death, majority of subjects 147 (94.8%) were continuous ambulatory peritoneal dialysis (CAPD) and 8 (5.2%) of the subjects were automated peritoneal dialysis (APD). **Conclusion-** This study demonstrates that low level of individual income could even be a risk factor for the onset of peritonitis and for treatment failure in PD patients. As our study found a significantly higher risk of treatment failure in low-income patients than high-income patients, the reinforcement of healthy policies in such population is additionally beneficial. National expenditure on health and medical insurance should be improved, especially for the patients with low individual incomes and the medical insurance policies for low-income patients should be improved.
Keywords- Hypoalbuminemia, Cox Regression Models, Mortality, Socioeconomic Factors.

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INTRODUCTION-

One of the foremost frequent reason behind peritoneal dialysis (PD) failure is higher incidence rate of peritonitis with significant effects on patient morbidity and mortality.(1) Observational differences within the rate of incidence with peritonitis are mentioned between medical centers and nations (2) which suggest that patient characteristics, various factors associated with therapy and also the environment, may influence the danger of peritonitis. Black race(3,4) diabetes(3,4) advanced age (3) obesity (5) malnutrition (6) hypoalbuminemia (7) reduced residual renal function(8) and former peritonitis(3) are some demographic and physiological risk factors for

peritonitis in PD patients are described within the previous literature. Moreover, the speed of peritonitis is also influenced by socioeconomic factors also like income and education level.[9–11] The previous literature mentioned that patients with low individual income had the next prevalence of peritonitis than other patients, patients with low individual income had significantly poorer nutritional status and bioclinical factors that includes low hemoglobin and altered albumin in comparison to the opposite patients.[12] Multivariable Cox regression models are wont to adjust for potential confounding factors, bias should be unavoidable. Previous literature of the association between socioeconomic status (SES) and risk factors of peritonitis haven't used propensity score matching analysis to induce the results based onto the results of confounding variables and bias.[9–13] Therefore, we aimed to analyze if socioeconomic status (SES) predict the primary episode of peritonitis, using data from a large-scale multi-center. The results is also helpful for implementing treatment plans on individual level with different SES backgrounds to decrease the incidence rate of peritonitis and increase the survival rate of patients undergoing PD.

MATERIALS AND METHODS-

The study will be longitudinal. Each patient will be followed up for 2 year**.** The study will be conducted in the Peritoneal Dialysis Unit, Department of Nephrology, SGPGIMS, Lucknow, U. P. Number of episodes of peritonitis, blood samples, peritoneal fluid, dietary recall and anthropometry will be the tools for research. Patients will be grouped based on socioeconomic score. The income according to the income tax returns will used to classify the subjects. A sample size of 155 produces a two-sided 90% confidence interval with a width equal to 0.200 when the sample correlation is 0.500. Hence a total of one hundred (155) patients on CAPD and APD will be recruited. Hence there will be two groups of patients

1) patients who are on CAPD
2) patients who are initiated on APD.

INCLUSION CRITERIA:

- Patients who will be on CAPD and APD
- Patients who give written consent to participate in the study.

EXCLUSION CRITERIA:

- Patients who do not give consent to participate in the study.
- Patients with malignancy.

Diagnosis of peritonitis- If peritonitis was suspected, a sample of PD effluent was sent for a cell count (WCC) (5 mL in a veryn EDTA tube) and bacterial culture (10 mL in a blood culture bottle) under International Society for Peritoneal Dialysis (ISPD) guidelines. [1]

Treatment modalities- Peritonitis episodes were treated using standard antibiotic protocol, as modified by ISPD guidelines [1]. Treatment success was defined because the complete resolution of peritonitis (PD effluent WCC < 100/μL and clinical resolution) without the requirement for Tenckhoff catheter removal. Conversely, treatment failure was defined as death due to the peritonitis episode or transfer to hemodialysis (HD) during the course of peritonitis treatment.

Statistical analysis- All probabilities were 2-tailed, and also the level of significance was set at 0.05. Statistical analysis was performed using SPSS for Windows software version 13.0

RESULTS:

The frequency and percentage of subjects according to the gender, age in group, socio-economic status group score 2 high socio-economic status group, and score 3 upper middle socio-economic status group, diagnosis criteria, CAPD/APD, peritonitis, catheter removal and death.

GENDER

Majority of subjects 96 (61.9%) were male and 59 (38.1%) were female.

AGE IN GROUP

Majority of subjects 83 (53.5%) were in the age group 41-60 years, 45 (29.0%) were in the age group >60years, 27 (17.4%) were in the age group <40 years.

SES

Majority of subjects 82 (52.9%) were in the score 3 (upper middle) socio-economic status group and 73 (47.1%) of the subjects were score 2 (high) socio-economic status group.

DIAGNOSIS CRITERIA

Majority of subjects 78 (50.3%) were hyper tension, diabetes mellitus and end stage renal disease, 64 (41.3%) of the subjects were hyper tension, and end stage renal disease, 13 (8.4%) of the subject were diabetes mellitus and end stage renal disease.

CAPD/APD

Majority of subjects 147 (94.8%) were continuous ambulatory peritoneal dialysis (CAPD) and 8 (5.2%) of the subjects were automated peritoneal dialysis (APD).

PERITONITIS

Majority of subjects 112(72.1%) were no peritonitis and 43 (27.9%) of the subjects were peritonitis (Table-1,2,3 and fig.1)

Table 1: Frequency (F) and percentage (%) distribution of subjects according to their demographic variables

Demographic Variables		Frequency	Percentage %
GENDER CODE	1 M	96	61.9%
	2 F	59	38.1%
	Total	155	100.0%
AGE IN GROUP	<= 40 years	27	17.4%
	41-60 years	83	53.5%
	>60 years	45	29.0%
	Total	155	100.0%
SES CODE	2 High	73	47.1%
	3 U M	82	52.9%
	Total	155	100.0%
DIAG CODE	1 HT. ESRD	64	41.3%
	2 DM. ESRD	13	8.4%
	3 HT.DM. ESRD	78	50.3%
	Total	155	100.0%
CAPD/APD	1 CAPD	147	94.8%
	2 APD	8	5.2%
	Total	155	100.0%
CODE OF PERI	1 Yes	43	27.9%
	2 No	112	72.1%
	Total	155	100.0%
CODE OF CATH REMO	1 Yes	36	23.2%
	2 No	119	76.8%
	Total	155	100.0%
CODE OF DEATH	1 Yes	50	32.3%
	2 No	105	67.7%
	Total	155	100.0%

Table-2 code of peri * CAPD/APD cross tabulation

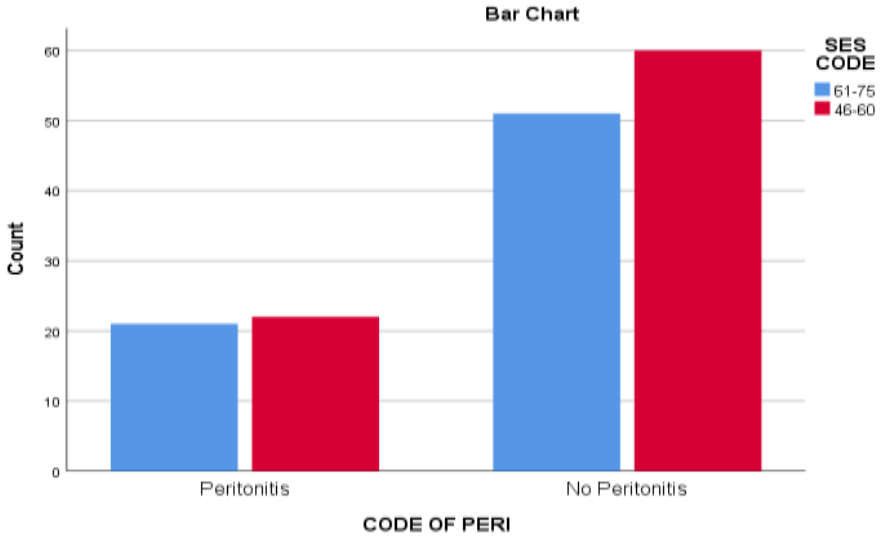
			CAPD/APD		Total
			1	2	
CODE OF PERI	1	Count	39	4	43
		% within CODE OF PERI	90.7%	9.3%	100.0%
		% within CAPD/APD	26.7%	50.0%	27.9%
		% of Total	25.3%	2.6%	27.9%
	2	Count	107	4	111
		% within CODE OF PERI	96.4%	3.6%	100.0%
		% within CAPD/APD	73.3%	50.0%	72.1%
		% of Total	69.5%	2.6%	72.1%
Total		Count	146	8	154
		% within CODE OF PERI	94.8%	5.2%	100.0%
		% within CAPD/APD	100.0%	100.0%	100.0%
		% of Total	94.8%	5.2%	100.0%

Table-3 Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.044[a]	1	.153		
Continuity Correction[b]	1.050	1	.305		
Likelihood Ratio	1.842	1	.175		
Fisher's Exact Test				.220	.152
Linear-by-Linear Association	2.030	1	.154		
N of Valid Cases	155				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.23.
b. Computed only for a 2x2 table

Fig-1 Bar chart showing the distribution of the subject regarding to their peritonitis or no peritonitis.



DISCUSSION

The key finding of this huge, multi-center, retrospective cohort study is that low individual income could be a significant risk factor for initial peritonitis and treatment failure. And living in developed regions may be a significant risk factor for initial peritonitis. To our knowledge, this can be the primary study to guage the roles of SES variables on initial peritonitis and its outcomes in PD patients, using propensity score matching analysis. However, after propensity score matching for statistically significant bioclinical factors, the web effect of individual income on initial peritonitis still remained statistically significant. There may are other confounders of peritonitis risk that we failed to take under consideration in our study. Second, as shown in our previous paper, the proportion of individual income used for medical expenses within the low income group was significantly over the proportion within the median- and high-income groups [(14)] According to data from the globe Health Organization (WHO) website [(15)] the typical total expenditure on health as a percentage of gross domestic product (GDP) in China from 2009 to 2011 was 5.1%, which was very cheap percentage among China, the us (17.7%), Brazil (8.9%), and Portugal (10.6%).

Therefore, individual income plays a very important role in medical expenditures in China. This could be a possible explanation for the difference in our findings compared with research findings within the U.S., Brazil, and Portugal [(15–23)] which have reported no relationship between income and initial peritonitis. We also found low individual income to be a risk factor for the treatment failure of PD after the initial incidence of peritonitis, compared with the high-income group. This result could probably be ascribed to the delay in referrals to nephrologists when symptoms of peritonitis developed in low-income patients. Our analysis failed to find any correlation between education level and therefore the onset of initial peritonitis or its outcome. This result's according to an analysis of a regional ESRD registry within the us, in which 1,595 new PD patients were observed over 2 years [(24)] but is contrary to recently published data from Brazil and Canada [(15,25)] One possible explanation is that our selected centers had highly professional PD doctors and nurses and well-established training programs. Patients and their homecare helpers often were trained simultaneously, which probably led to stronger family support [(26)] Whether better compliance among Asian individuals [(27-30)] plays a task during this phenomenon is unclear.

To the most effective of our knowledge, our study, which examined an outsized cohort of adult PD patients in China, is that the first study to investigate the link between SES and initial peritonitis using propensity score matching analysis. There have been 563 outcome events, accounting for 25.9% of the full episodes, which allowed us to make a regression model containing SES and some recognized confounders to explore the predictive ability of SES. The demographic characteristics and therefore the distribution of causative organisms are typical of these previously reported, supporting the generalizability of our findings to other PD cohorts elsewhere.

CONCLUSION

This study demonstrates that low level of individual income could even be a risk factor for the onset of peritonitis and for treatment failure in PD patients, As our study found a significantly higher risk of treatment failure in low-income patients than high-income patients, the reinforcement of healthy policies in such population is additionally beneficial. National expenditure on health and medical insurance should be improved, especially for the patients with low individual incomes and the medical insurance policies for low-income patients should be improved.

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