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RESEARCH ARTICLE
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ASSOCIATION OF PSORIASIS WITH CARDIOVASCULAR MORBIDITY DETECTED BY HEART RATE VARIABILITY

Neha Aggarwal[1], Jai Kumar[2*], Chander Shekhar[3], Jyotsana Shukla[4]

[1]Assistant Professor, Department of Physiology, VCSG Government Institute of Medical Sciences & Research, Srinagar Garhwal, Uttarakhand, India – 246174
[2*]Professor, Department of Physiology, VCSG Government Institute of Medical Sciences & Research, Srinagar Garhwal, Uttarakhand, India – 246174
[3]Assistant Professor, Department of Physiology, GMC Karauli, Bichpuri, Rajasthan-322241
[4]Professor, Department of Physiology, SMS medical college, Jaipur, Rajasthan- 302004

***Corresponding Author:** Dr Jai Kumar
*Professor & Head, Department of Physiology, VCSG Government Institute of Medical Sciences & Research, Srinagar Garhwal, Uttarakhand, India – 246174 Email: jackben2007@gmail.com, Phone number: +916398003187

ABSTRACT
Several studies have documented an increased prevalence of cardiovascular diseases in patients with severe psoriasis but not enough studies are there suggesting this association with mild and moderate psoriasis. Heart Rate Variability (HRV) is a noninvasive method to interpret the sympathetic-parasymthetic interplay on cardiovascular system (CVS). Our study indicated an increased sympathetic activity and decreased parasympathetic activity measured by HRV in moderate cutaneous psoriasis (Psoriasis Area Severity Index [PASI] score 5-10), in the absence of other cardiovascular morbidities. Since the increase in sympathetic and decrease in parasympathetic activity can be associated with increased risk for CVS morbidities, moderate cutaneous psoriasis can be considered as an independent risk factor for cardiovascular disorders.

INTRODUCTION
Psoriasis is a chronic systemic immune mediated inflammatory skin disease with a wide spectrum of clinical manifestation affecting approximately 2–4 percent of the general population[1]. Various studies have documented increased cardiovascular disease related mortality in psoriatic patients[2]. Recent developments suggest that ANS dysfunction may lead to immune dysregulation[3]. Given that inflammation and ANS dysfunction are recognised pathological features of numerous cardiovascular diseases[4]. ANS-immune dysregulation may well contribute to the increased cardiovascular risk in Psoriatic patients.

Amidst the different noninvasive techniques for evaluation of autonomic system status, HRV has emerged as a simple, noninvasive method to evaluate the sympatho-vagal balance at the sino atrial level and most widely performed measure of autonomic function[5]. This study was designed to understand the autonomic nervous system dysfunction and explore the extent of involvement in Psoriatic patients and to find out the causal factor among the association of psoriasis and cardiovascular mortality.

MATERIAL AND METHODS

The present study was conducted in Department of Physiology at Sawai Mansingh Medical College, Jaipur. The study was conducted on 40 patients of cutaneous moderate psoriasis (Psoriasis Area Severity Index [PASI] score 5-10) of 30 - 40 years age of either sex. Patients with other forms of psoriasis, any other acute/chronic illness affecting ANS functions, taking drugs known to affect ANS functions, smoker and alcoholics were excluded from the study. The normal age and sex matched subjects were selected as controls from employees of the institute. The subjects were divided into the following two groups:

GROUP A (40 in number) included patients with moderate psoriasis.

GROUP B (40 in number) included age and sex matched healthy controls.

The subjects were informed about the whole procedure in detail in their own language to allay any fear or apprehension. Written consent was taken from every individual to undergo the whole procedure. The study was conducted in a particular time period (from 10 AM to 12 PM) to avoid diurnal variation. Recording was done in supine position by continuous ECG recording on a window based Cardiac Autonomic Neuropathy System (CAN Win) version 1.0. The interpretation of result was statistically analysed using SPSS software (version 22) by unpaired student t-test with statistical significance assigned at p-value < 0.05.

HRV was analysed by linear methods with time-domain (traditional statistical) and frequency domain (spectral) analysis. Time domain parameters used are SDNN (Standard deviation of all R-R intervals) in ms, RMSSD (Square root of the mean of the sum of squares of differences between successive NN intervals) in ms and pNN50 (NN50 count divided by the total number of all R-R intervals) in %. All these time domain parameters measure parasympathetic activity. Frequency domain of HRV analyses the periodic oscillation of heart rate. Power spectra of frequency domain can be classified into 2 major bands: the high frequency band (HF) and the low frequency band (LF). HF component signifies parasympathetic modulation while LF component gets modulated by both sympathetic and parasympathetic arm of ANS. LF/HF ratio is considered as a mirror of sympathovagal balance. Thus, sympathetic over activity or parasympathetic reduction increases this ratio[6].

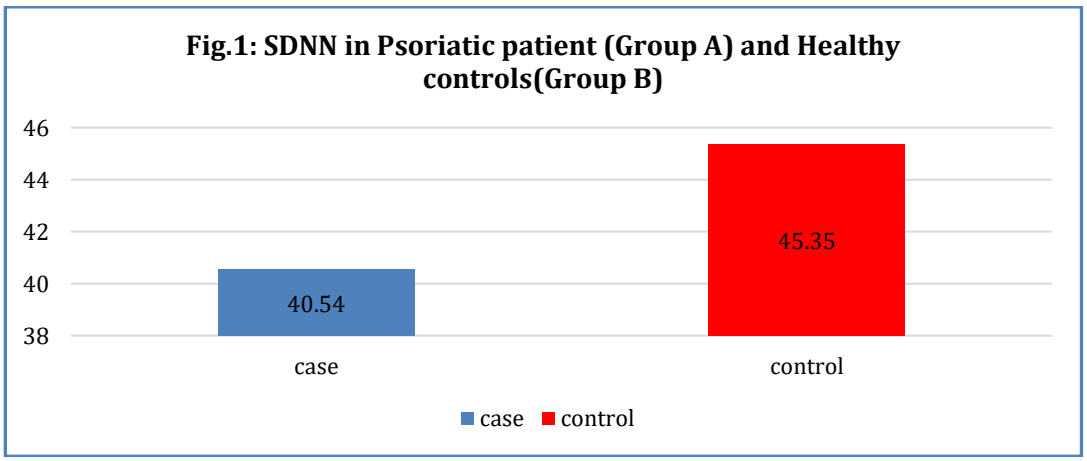
RESULTS:

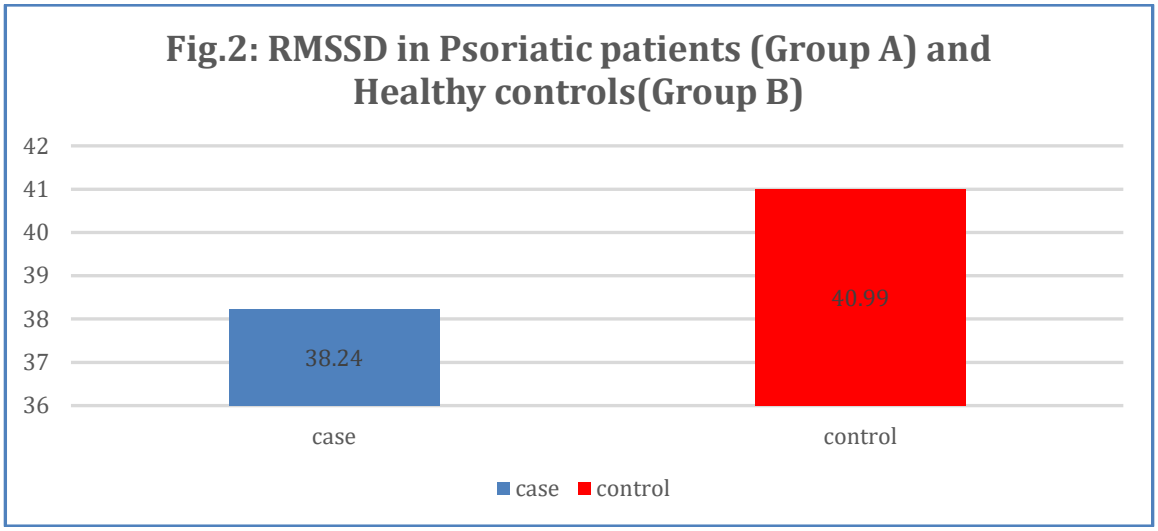
Results observed were compared in both tabular and figure forms.

Table 1

Table 1. Comparison of Time domain analysis of HRV among Psoriatic patients and Controls			
	Controls	**Psoriatic Patients**	**P Value**
SDNN	45.35±16.07	40.54±17.28	<0.05
RMSSD	40.99±22.99	38.24±24.99	<0.05
pNN50%	19.98±3.94	15.59±4.09	<0.05

The time-domain analysis showed a significant reduction of SDNN, RMSSD, and pN50 components among psoriatic patients compared to controls as shown in table 1 and figures 1, 2 & 3.





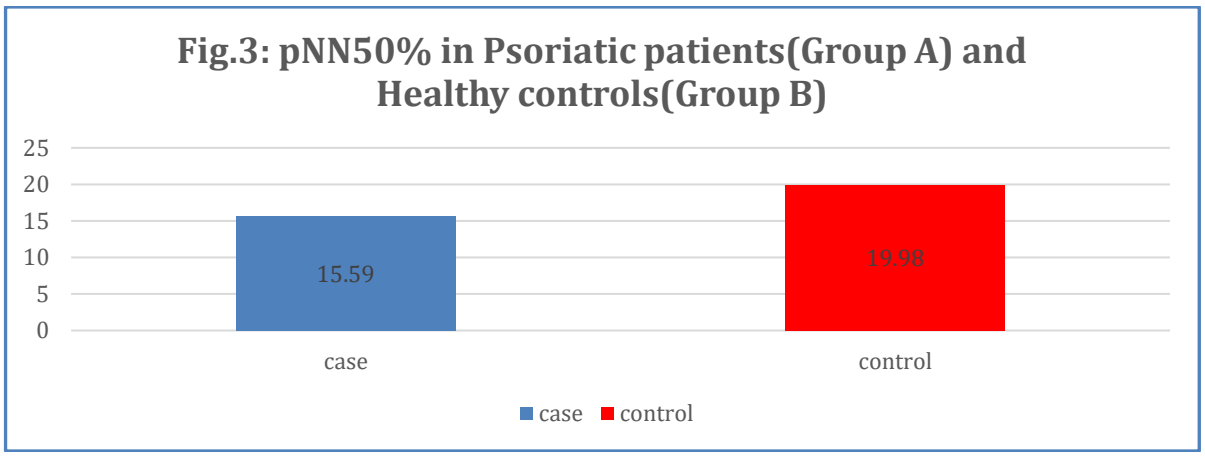
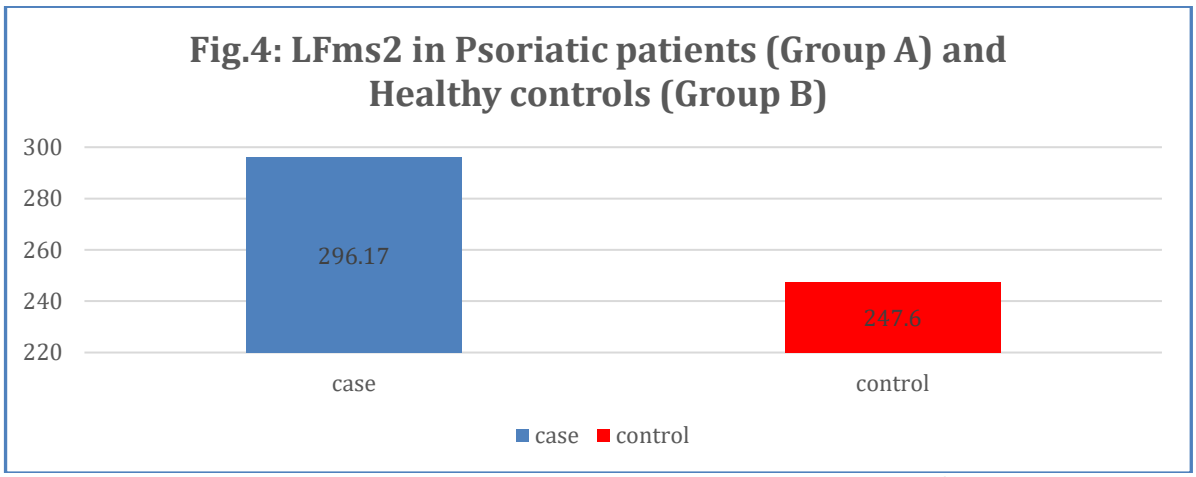
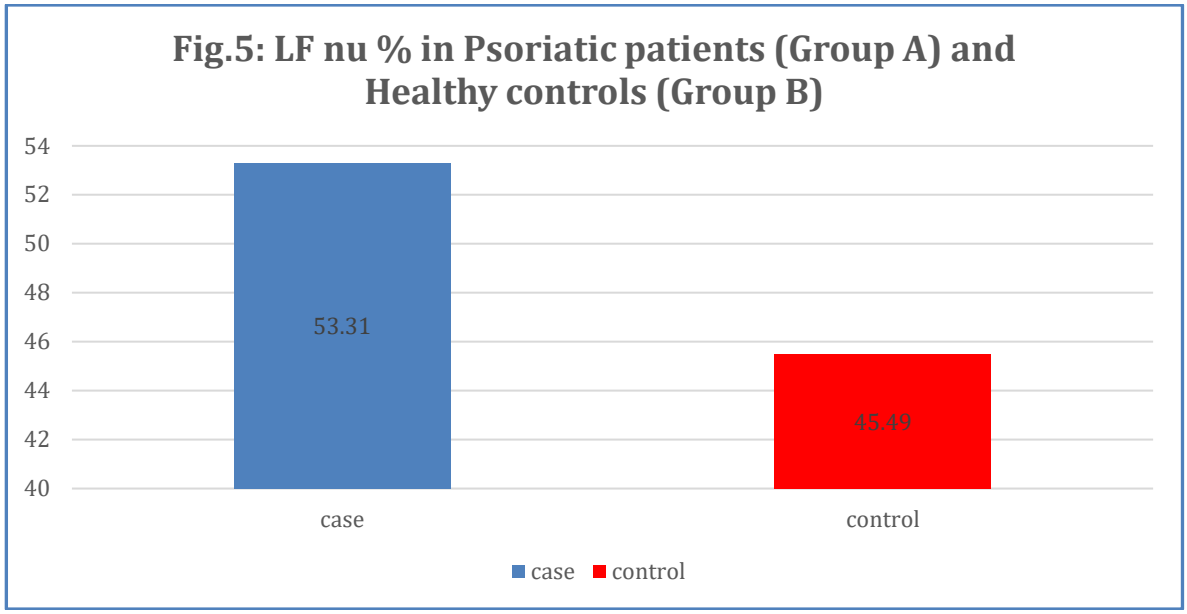


Table 2

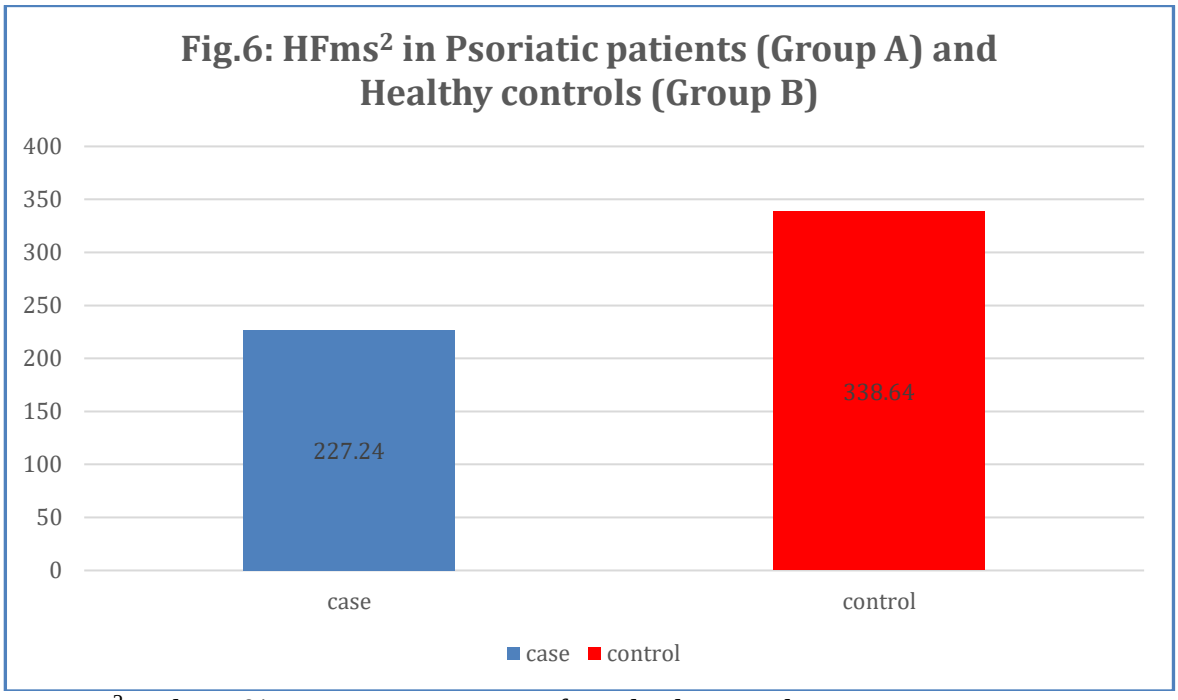
Table 2. Comparison of Frequency domain analysis of HRV among Psoriatic patients and Controls			
	Controls	**Psoriatic Patients**	**P Value**
LFMS2	247.60±212.58	296.17±270.66	>0.05
LF%	45.49±13.33	53.31±17.93	<0.05
HFMS2	338.64±282.23	227.24±165.61	<0.05
HF%	54.76±13.80	44.31±15.83	<0.05
LF/HF	0.96±0.65	1.47±0.79	<0.05



The frequency domain analysis showed significant increase in LF Ms^2 in psoriatic patients compared to control group as shown in table 2 and figure 4.

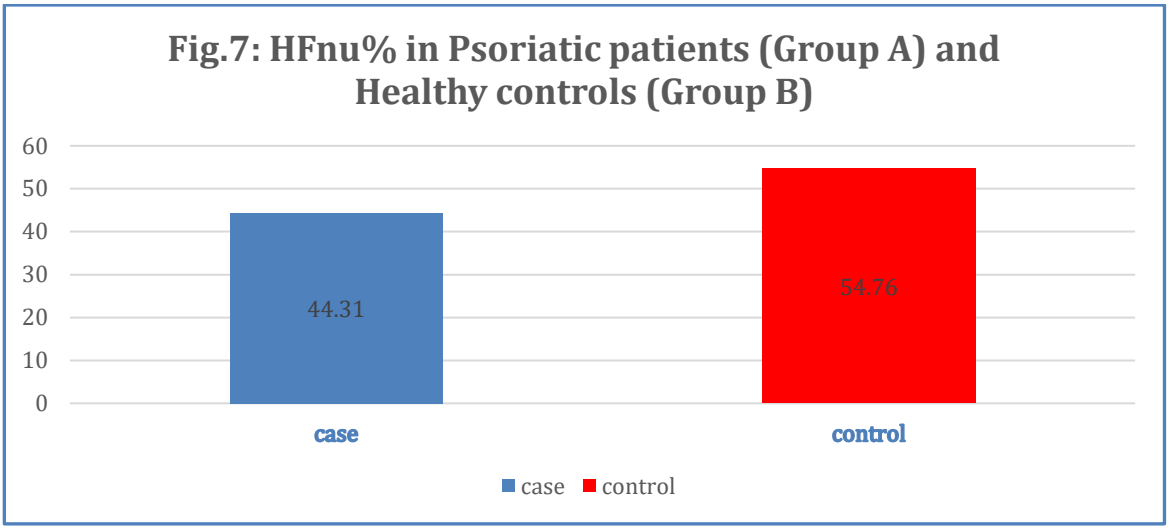


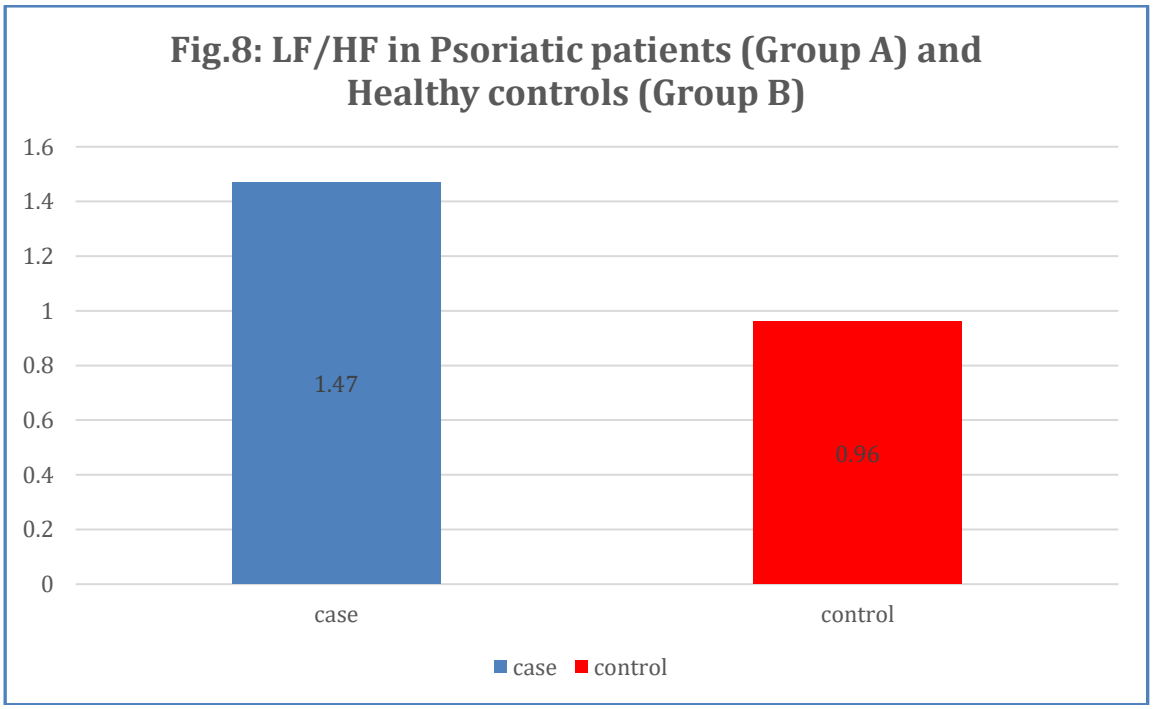
There is an increase in LF % among psoriatic patients compared to control group, though the increase is not statistically significant as shown in table 2 and figure 5.



Both HF Ms^2 and HF % components are significantly decreased in psoriatic patients compared to control group as shown in table 2 and figures 6 & 7.

Similarly, LF/HF ratio is also significantly increased in psoriatic patients compared to control group as shown in table 2 and figure 8.





DISCUSSION:

SDNN, RMSSD and pN50% components of time domain analysis depict parasympathetic activity. In our study all these three components are significantly reduced among psoriatic patients showing reduced parasympathetic activity compared to healthy controls. Similarly in frequency domain analysis HF component depicts parasympathetic activity. We found in our study that HF component is significantly reduced among psoriatic patients in comparison with healthy controls. LF/HF ratio is the measurement of sympathetic-parasympathetic balance. We found in our study that LF/HF ratio is significantly increased among psoriatic patients in comparison with healthy controls showing an increase in sympathetic activity. Several observational studies, such as, Bicer et al 2010, Proietti et al 2014 and Kanagashree et al 2005 have found the increased sympathetic activity among psoriatic patients suggesting a link between psoriasis and CV risk[7,8]. The present study has been designed to demonstrate this link/association as a causal factor.

CONCLUSION:

Our study concludes that psoriatic disease does have a causal association with CV disorders attributed to the disease but more studies with high number of participating subjects need for corroboration of this result.

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