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## ORIGINAL RESEARCH

# CLINICAL PRESENTATION OF NEWLY DIAGNOSED TYPE 2 DIABETES MELLITUS PATIENTS IN TERTIARY CARE CENTRE IN CENTRAL INDIA

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**Abstract**

**Background:** Diabetes mellitus refers to group of common metabolic disorders that share the phenotype of hyperglycemia. Diabetes Mellitus (DM) is one of the commonest diseases in world. India has earned the dubious distinction of being termed the "Diabetic capital of the world" with prevalence of DM in India was 9.3%. The prevalence varies widely among different states of India because of various reasons. The presentation of diabetes is usually delayed depending upon the awareness, screening, health infrastructure and educational background of people in the region. Delayed diagnosis of diabetes contributes to increased morbidity and mortality due to presence of chronic complications associated with same. We tried to bring out this data from Central part of India which happens to be among poor state in terms of health infrastructure.

**Objective**: This study was aimed at assessing the presentation and clinical profile of newly detected type 2 DM patients in a tertiary care hospital in central India. This also included the screening of the chronic complications already present at the time of diagnosis.

**Material & methods**: The present cross sectional study was done at L.N. Medical College and J.K. Hospital, Kolar Road Bhopal (M.P) India. A standard Performa for recording the clinical profile was used. After written consent, all patients were subjected to detailed history and clinical examination. Patient's data were collected over a period of two years. Data are presented as a mean, using SPSS software version 15.

**Results :** Out of 410 study participants, 53.4% were males and 46.6% were females. Majority of the patients about 65.2% belong to age group between 31-50 years. Mean age of study participants was 38.24±7.24 years. Urban participants were 53.7% and in rural was 46.3%. Mean HbA1c in rural and urban was 10.33% and 10.99%, respectively. Family history of diabetes was among 57.6% participants while 42.5% were not having any family history. The common presenting symptoms in this study was frequent urination (62.19%), increased thirst (49.02%), weight loss (44.87%), tingling (32.2 %), polyphagia (22.92%), dry skin (13.17%), numbness (11.7%), burning feet (10.97%), sexual dysfunction (7.07%) along with dizziness (5.85%). The common chronic complication in present study was neuropathy (52%), nephropathy (28.78%), cardiovascular disease (23.9%)

**Conclusion**: This study results highlights that the diabetes is invading much younger population in India which is a matter of concern. This is also contrary to old perception that

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diabetes is a disease of fifties or sixties. This study highlights the importance of early screening. Substantial proportions of newly diagnosed patients have evidence of micro vascular and macro vascular complications. The presence of chronic complications which usually are seen after one or two decades reflect that there is a delay in diagnosis of diabetes in our region.

**Keywords:** Vascular complications, Diabetes

## Introduction

Diabetes mellitus refers to group of common metabolic disorders that share the phenotype of hyperglycemia. Diabetes Mellitus (DM) is one of the commonest diseases in world. India has earned the dubious distinction of being termed the "Diabetes capital of the world" with prevalence of DM in India was 9.3%. The total number of people living with diabetes is projected to rise to 643 million by 2030 and 783 million by 2045. The figures are expected to rise to 123 million in India itself by 2040.[1,2] The onset of T2DM is often insidious and is characterized by a long asymptomatic phase between the actual onset of diabetic hyperglycemia and clinical diagnosis. This phase has been estimated to last for at least 4–7years, resulting in 30–50% cases of type 2 diabetic patients remaining undiagnosed. This leads to the development of chronic complications of diabetes. These are categorized as "microvascular " when small blood vessels are impaired or "macrovascular" when the large arteries are damaged. The former affects the eye (retinopathy), kidney (nephropathy) and the nervous system (neuropathy) while macrovascular complications result in a host of cardiovascular disorders such as myocardial infarction (MI), angina, stroke and peripheral arterial disease (PAD).[3] The "Asian Indian Phenotype" is more prone to develop diabetes and premature coronary artery disease due to their certain unique clinical and biochemical abnormalities in Indians which include increased insulin resistance, higher waist circumference despite lower body mass index, lower adiponectin and higher highly sensitive C-reactive protein levels.[4] Depending on various factors such as duration of disease, presence of other risk factors and comorbidities as well as environmental and genetic factors, most patients with T2DM are at a risk of presenting concomitant diabetic complications at the time of diagnosis.[5]This study was aimed at assessing the clinical presentation of newly detected type 2 DM patients as well assessment of the complications already present at the time of diagnosis.

## Materials And Methodology

The present cross sectional study was done at L.N. Medical College and J.K. Hospital, Kolar Road Bhopal (M.P) India. The Study was started after taking permission from institute ethical committee. In this study, recently diagnosed type 2 diabetic patients of age 20 years and above from OPD and indoor of the hospital were included. Patients with Type1diabetes mellitus, any other severe illness, patients already diagnosed of diabetes mellitus and on treatment, refusal to be a part of the study, pregnancy were excluded from the study. After written consent, all patients were subjected to detailed history and clinical examination. Patient's data were collected over a period of two years. A standard Performa for recording the clinical profile and any complications if present was made. Data are presented as a mean, using SPSS software version15.P Values of less than 0.05 were considered to be statistically significant.

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**Results**

**Table 1: Comparison of age distribution between HbA1c groups**

| Age of patients | HbA1c | | | Total |
|---|---|---|---|---|
| | 6.5-7 | 7.1-9 | >9.1 | |
| 21-30 | 6 (18.8) | 0 (0) | 17 (6.6) | 23 (5.6) |
| 31-40 | 8 (25) | 28 (23) | 109 (42.6) | 145 (35.4) |
| 41-50 | 0 (0) | 36 (29.5) | 86 (33.6) | 122 (29.8) |
| 51-60 | 10 (31.2) | 50 (41) | 35 (13.7) | 95 (23.2) |
| 61-70 | 8 (25) | 0 (0) | 9 (3.5) | 17 (4.1) |
| >70 | 0 (0) | 8 (6.6) | 0 (0) | 8 (2) |
| Total | 32 (100) | 122 (100) | 256 (100) | 410 (100) |

In this study, majority of the patients 145 (35.4%) had age between 31-40 years which is followed by 41-50 years 122 (29.8%) and 51-60 years 95 (23.2%). Mean age of study participants was 38.24±7.24 years. The age distribution in present study was highly significant with p value of <0.001.

**Table 2: Comparison of sex distribution between HbA1c groups**

| Sex | HbA1c | | | Total | Mean HbA1C |
|---|---|---|---|---|---|
| | 6.5-7 | 7.1-9 | >9.1 | | |
| Female | 26 (81.2) | 73 (59.8) | 92 (35.9) | 191 (46.6) | 10.32 |
| Male | 6 (18.8) | 49 (40.2) | 164(64.1) | 219 (53.4) | 11.09 |
| Total | 32 (100) | 122 (100) | 256 (100) | 410 (100) | 10.51 |

Out of 410 study participants, 53.4% were males and 46.6% were female shaving mean HbA1c of 11.09 and 10.32, respectively. The gender distribution in present study was highly significant with p value of <0.001.

**Table 3: Comparison of residence distribution between HbA1c groups**

| Residence | HbA1c | | | Total | Mean HbA1C |
|---|---|---|---|---|---|
| | 6.5-7 | 7.1-9 | >9.1 | | |
| RURAL | 8 (25) | 71 (58.2) | 111 (43.4) | 190 (46.3) | 10.33 |
| URBAN | 24 (75) | 51 (41.8) | 145 (56.6) | 220 (53.7) | 10.99 |
| Total | 32 (100) | 122 (100) | 256 (100) | 410 (100) | 10.51 |

In this study, distribution of the study participants in urban was 220 (53.7%) and in rural was 190(46.3%). Mean HbA1c in rural and urban was 10.33% and 10.99%, respectively. The residence distribution in present study was highly significant with p value of 0.001.

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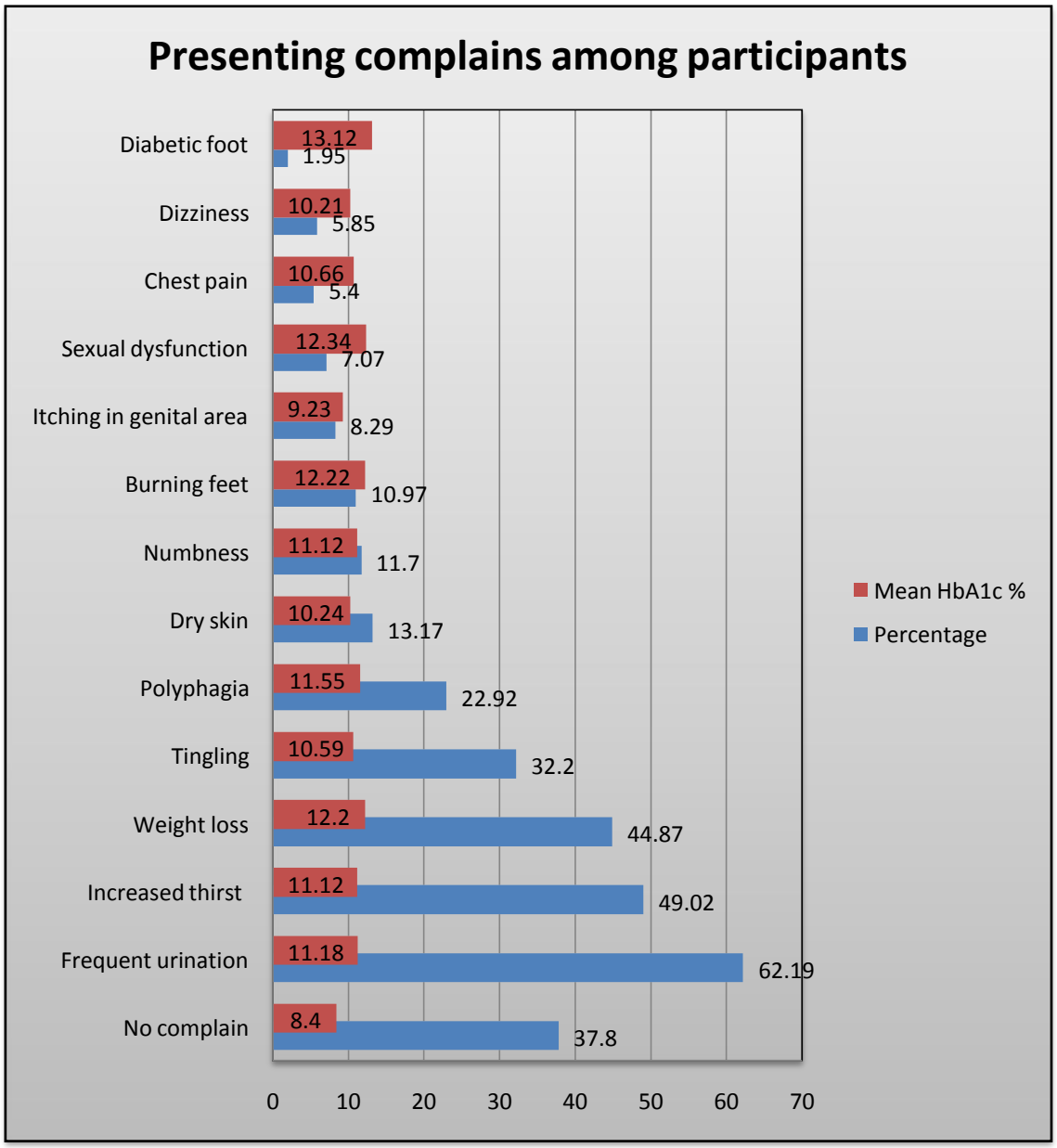
**Table 4: Comparing Family history of diabetes between HbA1c groups**

| Family history of diabetes | HbA1c | | | Total | Mean HbA1c |
|---|---|---|---|---|---|
| | 6.5-7 | 7.1-9 | >9.1 | | |
| No | 14 (43.8) | 69(56.6) | 91 (35.6) | 174 (42.5) | 10.25 |
| Yes | 18 (56.2) | 53 (43.4) | 165(64.5) | 236 (57.5) | 11.09 |
| Total | 32 (100) | 122 (100) | 256 (100) | 410 (100) | 10.51 |

Family history of diabetes in this study was present among 236 (57.6%) participants while 174 (42.5%) were not having any family history. There was a significant association between family history and abnormal hbA1c level as revealed by the highly significant value of 0.001.

**Graph 1: Presenting complains among participants**



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The most common presenting complaints in this study was frequent urination which was seen in 255 (62.19%) and having mean HbA1c of 11.18%followed by increased thirst complained by 201 (49.02%) and weight loss in 184(44.87%) of participants.Moderately occurring symptoms included: Tingling (32.2%), Polyphagia (22.92%),Dry skin (13.17%), Numbness (11.7%), burning feet (10.97%),Sexual dysfunction(7.07%), Dizziness (5.85%).
In the present study, hypertension was the most common coexisting illness found in 71(17.31%) of participants followed by hypothyroidism (9.3%), stroke (8.3%),pulmonary tuberculosis (7.6%),coronary artery disease (2.68%).

**Table 5: Showing prevalence of vascular complications among participants**

| Complications | Frequency | Percentage |
|---|---|---|
| Neuropathy | 213 | 52 |
| Nephropathy | 159 | 28.78 |
| Cardiovascular disease | 98 | 23.9 |
| Retinopathy | 60 | 14.63 |
| Peripheral vasculardisease | 46 | 11.21 |
| Cerebrovasculardisease | 42 | 10.24 |

Most common complication in present study was neuropathy (52%) followed by nephropathy (28.78%), cardiovascular disease (23.9%), Retinopathy (14.63%), PVD (11.21%) and cerebrovascular (10.24%) disease.

**Discussion**

The landmark trial UK Prospective Diabetes Study [UK1999] has thoroughly elaborated the clinical profile and prevalence of complications in newly diagnosed diabetes patients 20yearsago.[6]
In this study 410 patients were analyzed. Among them majority of the patients, 35.4% were aged between 31-40 years, which was followed by41-50 years 29.8%, 51-60 years 23.2% and 5.6% patients belongs to 20-30 years age group. Mean age of study participants was 38.24±7.24 years. A study by Sosale et al done around 2014 shows that the majority of patients (76%) were from an age group of 31-50 years. They observed that majority of patients were from a younger age group 31-40 (30%) and (46%) population was from the age group of 41-50years.[7]
In this study, total of 410 patients were enrolled for analysis. Out of these53.4% were males and 46.6% were females. A statistically significant high mean HbA1c was found among male (11.09%) as compared to female patients (10.32). Bettegowda S et al reported prevalence of 56% in males and 44% in females.[8]
In this study out of total 410 patients slightly higher proportion of participants belong to urban 220 (53.7%) while 190 (46.3%) were from the rural area. Mean HbA1c in rural and urban was 10.33%and 10.99%, respectively. The mean HbA1c among urban patients was high as compared to rural patients and was statistically highly significant.
In this study more than half of the patients (57.6%) had positive family history of diabetes. In this study patients with positive family had high mean HbA1c 11.09%. This study showed a significant association between family history and abnormal HbA1c level as revealed by the highly significant P value of 0.001. Mayega RW et al showed that 20.4% give positive family history of diabetes in their study.[9]

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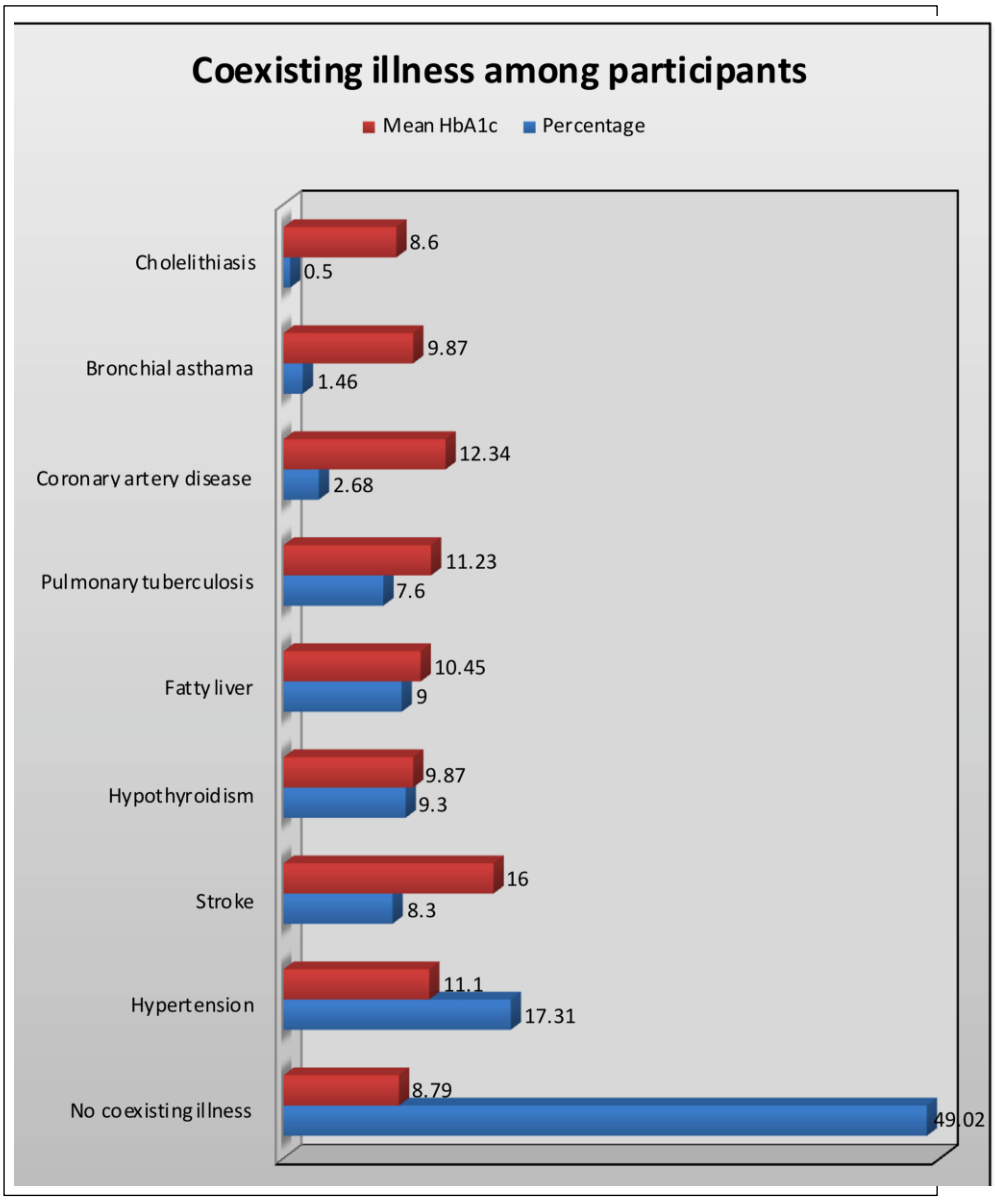
In this study out of410patients, 155(37.8%) patients had no any symptoms at the time of diagnosis. These patients were diagnosed as diabetic when they were admitted for some other disease or in screening programs. The most common presenting complain of participants in this study was frequent urination which was seen in 255 (62.19%) followed by frequent thirst in 201 (49.02%) and weight loss in184 (44.87%). Moderately occurring symptoms included Tingling (32.2 %), Polyphagia (22.92%), Dry skin (13.17%), Numbness (11.7%), Burning feet (10.97%), Sexual dysfunction (7.07%) and Dizziness (5.85%). A study of Suresh Babu et al showed that most common presenting symptom was polyuria (51%), with polydipsia (32%), weight loss (35%) and weakness (38%).[10]

**Graph 2. Co existing illness among participants.**



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Most common complication in present study was neuropathy (52%) followed by nephropathy(28.78%), cardiovascular disease (23.9%), retinopathy(14.63), PVD (11.21%) and cerebrovascular disease (10.24%).Bettegowda S showed the prevalence of diabetic retinopathy to be 20%.[8]Suresh Babu et al reported prevalence of cerebrovascular disease to be 3%.[10]Mitra VV et al who also reported prevalence of nephropathy to be 28%.[11]The results of this study are comparable with results of Nambuya et al and Iraj Hydari et al 2014 who found peripheral neuropathy in 46% and 52 % patient respectively.12,[3] Patel V et al studied the prevalence of diabetic nephropathy in recently detected cases of type2 diabetes mellitus and showed that as many as 43 outof100 patients were found to have Diabetic nephropathy.[13] Bonora E et al have report lower prevalence of nephropathy 11.9% as compared to this study.[14]Sosale et al showed the prevalence of CAD to be 6% in newly diagnosed diabetic patients.[7]Leena Firmal et al have reported prevalence of coronary artery disease(CAD) to be 40.2% while the prevalence of CAD was 11.4% in study done by Taneja et al.[15,16]

The results of this study coincide with the finding of Taneja et al 2018 and Suresh Babu et al who reported prevalence of cerebrovascular disease to be 3.2% and 3% respectively while Leena Firmal et al showed the prevalence of Cerebrovascular diseasetobe10.1%.[15,10,16]Mohan V et al. have reported prevalence of PVD in newly diagnosed patients to be 3.5%.[4]The results of this study also coincide with results of UKPDS-6 study and Hoorn Screening study which showed the prevalence of PVD in newly diagnosed patients with type 2 diabetes to be 13% and10% respectively.[10]

The awareness of the disease and its complications is less than satisfactory. There is a lack of knowledge, appropriate attitude measures, or practice studies that can help determine the gaps in knowledge among physicians and people living with diabetes in India. Hence, having more structured diabetes education programs in India is imperative. Lack of a robust referral system to provide quality and specialist care and lack of understanding for early diagnosis, prevention, and control of chronic complications in diabetes.

The study has been conducted in the Central part of India from where very less data was available with regarding type 2 diabetes mellitus patients, presentation of type 2 diabetes mellitus, the existence of comorbidities. It should focus on the fact that it is already too late to diagnose diabetes in Central part of India because of the poor health structure as well as poor screening strategies. Implementing efficacious health service interventions like patient education in a real-world resource-constrained setting is not without challenges and may not prove effective in improving patient outcomes. The awareness of diabetes among general population need to be improved so as to get detected early.

## Conclusion

In this study we concluded that there is change in pattern of diabetes as majority of patients were in younger age group. This study shows that the age of onset of diabetes has shifted to a decade's earlier. This study highlights the importance of early screening as substantial proportions of newly diagnosed patients have evidence of microvascular and macrovascular complication at the time of diagnosis. There is high prevalence of cardiovascular risk factors such as dyslipidemia, obesity and hypertension which emphasize on assessment of cardiovascular risk factors at the time of diagnosis in all the patients with T2DM Furthermore, as the number of subjects with diabetes is expected to increase this would translate into a heavy economic burden and compromise the quality of life as well. Beyond screening, education of our high risk population regarding diabetes related complications must be started to encourage not only early medical consultation but also they should be educated for primordial and primary prevention of diabetes. Larger studies will be required to understand and optimize resources aimed at tackling the epidemic of diabetes and cardiovascular disease in India.

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**Limitations:**

1. Smaller sample only limiting to the patients from the OPD and IPD of L.N. Medical College and J.K. Hospital, Kolar Road Bhopal (M.P) India.
2. The data entry was based mainly on self-reporting of the complications by the patients.

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