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# Journal of Environmental and Healthcare Law

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- Planning and Management of the Construction of Structures
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# A Study to Find Out the Prevalence of Balance Impairments Among Patients of Diabetes Mellitus (TYPE II): A Cross Sectional Survey

**Maryam Suleman, Umber Fatima, Supervisor: Umber Fatima**

## ABSTRACT

*This cross sectional study aims to determine the prevalence of balance impairments among patients with diabetes mellitus type 2 and also to find out gender specificity with balance impairments among diabetic patients. Data is collected from DHQ hospital, Abbottabad, Physiotherapy Clinic, Women Institute of Rehabilitation Sciences, Abbottabad, Jinnah International hospital, Abbottabad and from general population of Abbottabad, general population of Rawalpindi, Double Dispensary No.4 P.O.F hospital WahCantt, Pakistan. Study is carried out at Women Institute of Rehabilitation Sciences, Abbottabad. This study is done within the period of 6 months. Data was collected with the help of a questionnaire and was analyzed using SPSS.200 diabetic subjects were included in this study; among them 56.5 %were females and 43.5% were males,50% belonged to Abbottabad and 50% belonged to Rawalpindi. 49% used insulin to control their hyperglycemic levels and 51% did not use insulin. 40% (80) used to have hyperglycemic level between 170-250mg/dl and 60%(120) used to have hyperglycemic level above 250 mg/dl. 67.5 % had numbness in legs,59% had trouble walking up or down inclined surface,34.5%had problem while standing still, 64% had balance lost while walking, 40.5% had fallen more than once in past year. 74% had light headedness or dizziness. 31% knocked down to unconsciousness. 73% suffered from frequent headaches. 46.5% had dizziness while watching moving object. Sudden changes in position worsened symptoms in 39.5% of the subjects. 31% suffered from head / neck trauma in past. 19.5% ever suffered from stroke. Total 128 subjects had balance lost while walking among them 73 were females, 55 males had balance lost while walking.35 females had balance lost while standing still and 34 males*

*had balance lost while standing still. 200 patients included in study, in which there were 80 people with hyperglycemic levels between 170-250mg/dl; out of which 50 had balance lost while walking,which 30 had balance lost while standing still.120 people were with hyperglycemic level above 250 mg/dl; out of which 78 had balance lost while walking, 50 did not lose balance while standing still.It is concluded that most of diabetic subjects had balance lost while walking or standing still. Frequent headaches, numbness in legs and falls were common among diabetics. Majority of the population complained of difficulty getting up from chair,balance lost while walking or standing still,frequent headaches, numbness in legs and falls.Diabetic patients with hyperglycemic levels above 250mg/dl had higher prevalence of balance lost while standing still or walking. Females had higher prevalence of fall and balance problems than men.*

***Key Words:Diabetes Mellitus, Balance, Impairments, Fall, Gender,***

## INTRODUCTION:

Diabetes is a metabolic diseases characterized by hyperglycemia ensuing from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia is linked with long-term damage, dysfunction and failure of different organs especially the eyes, kidneys, nerves, heart, and blood vessels. Hyperglycemia is caused due to Impairment of insulin secretion or defects in insulin action or

often both coexist in the same patient. [1]Diabetes mellitustype 2occurs in persons usually after forty years. It is characterized by mild onset. This is due to partial lack of insulin, so the patients are not always insulin dependent.[2]Type 1 diabetes or juvenile diabetes is also known as insulin-dependent diabetes.[3]Diabetes Mellitus patients develop primary symptoms such as polyuria, polydipsia, polyphagia and complications due to higher hyperglycemic levels such as visual disturbances, muscular weakness, neuropathy, retinopathy, early fatigue leading to fall and balance problems.[4]

Balance Impairment is a disturbance in balance that causes an individual to feel unsteady, for example, when standing or walking. It may be accompanied by feelings of spinning, or floating or having a sensation of movement.[5]Balance impairment can develop as a result of damage or deficit in following systems, as these are main components which help in maintaining balance by visual system (eyes), vestibular system (ears),Proprioceptive system (the body's sense of where it is in space). Degeneration or loss of function in any of these systems can lead to balance deficits.[6]Balance can be either static or dynamic Balance. Static balance is maintaining equilibrium when body is in stationary position. Dynamic balance is maintaining equilibrium when body is moving. Dynamic balance requires coordination which is a complex skill that requires not only good balance, but good levels of other fitness components such as strength and agility.Balance and coordination can be improved through practice and training with definite exercises. [7]Signs and Symptoms include sensation of dizziness or vertigo, Lightheadedness, Problem reading and difficulty seeing, disorientation, Nausea, Changes in blood pressure, Decreased attentiveness, Anxiety,Fatigue and Depression.[8] Causes of Balance impairments in diabeticsinclude inner ear disorders,changes in blood pressure, impaired blood glucose levels causing nerve damage and neuropathies, degenerative diseases, age related decline in balance function and vitamin deficiencies such as vitamin B12 deficiency.[9,10]Increased risk of fall is present in patients who have developed diabetic neuropathy. Vestibular system is equally important in providing orientation information. Long standing uncontrolled hyperglycemic levels lead to fall and balance problems through multiple ways including Diabetic neuropathy, Diabetic retinopathy, autonomic neuropathy, diabetic foot ulcer. Nerve fiber loss is the cause of insensitivity in DPN.[11, 12]Diabetes is common and its complication of balance impairment can cause severe problems and disabilities.

**OBJECTIVES OF STUDY:**

- To find out the Prevalence of Balance Impairments among Patients of Diabetes Mellitus (Type II)
- To find out the Gender Specificity of Balance and Fall Problems in Patients of Diabetes Mellitus Type 2

## MATERIALS AND METHODOLOGY:

**Study Design:**

Descriptive Cross-Sectional Study

**Source of Data:**

DHQ hospital, Abbottabad, Physiotherapy Clinic, Women Institute of Rehabilitation Sciences, Abbottabad, Jinnah International hospital, Abbottabad and from general population of Abbottabad and Rawalpindi, Double Dispensary No.4 P.O.F hospital WahCantt, Pakistan.

**Setting:** Study is carried out at Women Institute of Rehabilitation Sciences, Abbottabad.

**Duration of Study :** Six months

**Sample Size:** 200.

**Sample Selection:**

**Inclusion Criteria:**

- Patients having Type 2 Diabetes
- Patients with age from 40 years and above
- Both genders

**Exclusion Criteria:**

- Type I Diabetic patients
- People of age below 40 years
- Gestational Diabetes

**Data Collection Procedure:**

Informed consent was taken from the subjects. Topic of study was approved by ETHICAL COMMITTEE of WOMEN INSTITUTE OF REHABILITATION SCIENCES, ABBOTTABAD. Data was collected with the help of Questionnaire. The questionnaire contained close-ended questions. Data is primary that is researcher collected the data.

**Questionnaire:**

Self-designed Questionnaire derived from In-Balance Balance Scale.

**Data Analysis Procedure:**

Data has been entered and analyzedusing SPSS 20.0. Frequencies are calculated to determine the prevalence and gender specificity of fall and balance problems among patients of diabetes mellitus.

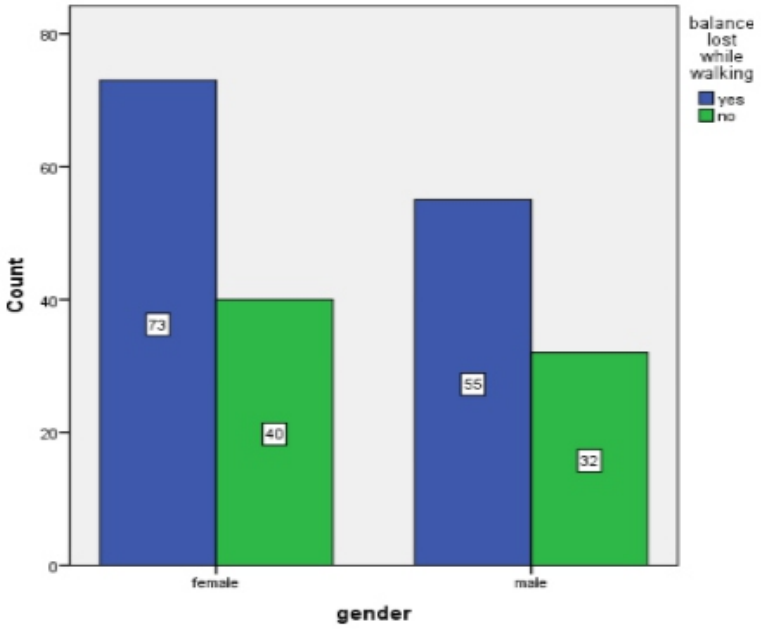
**STATISTICALANALYSIS:**

**CROSS TAB. 1: BALANCE LOST WHILE WALKING * GENDER**

There were total 200 patients in this study among which 128 subjects complained of losing balance while walking. Out of 128, 73 were females and 55 were males. 72 subjects did not lose balance while walking among them 40 were females and 32 were males. This is also shown in the following cluster bar chart.

| Balance Lost While Walking | Gender | | Total |
|---|---|---|---|
| | Female | Male | |
| Yes | 73 | 55 | 128 |
| No | 40 | 32 | 72 |
| Total | 113 | 87 | 200 |

**CLUSTER BAR CHART 1: BALANCE LOST WHILE WALKING * GENDER:**

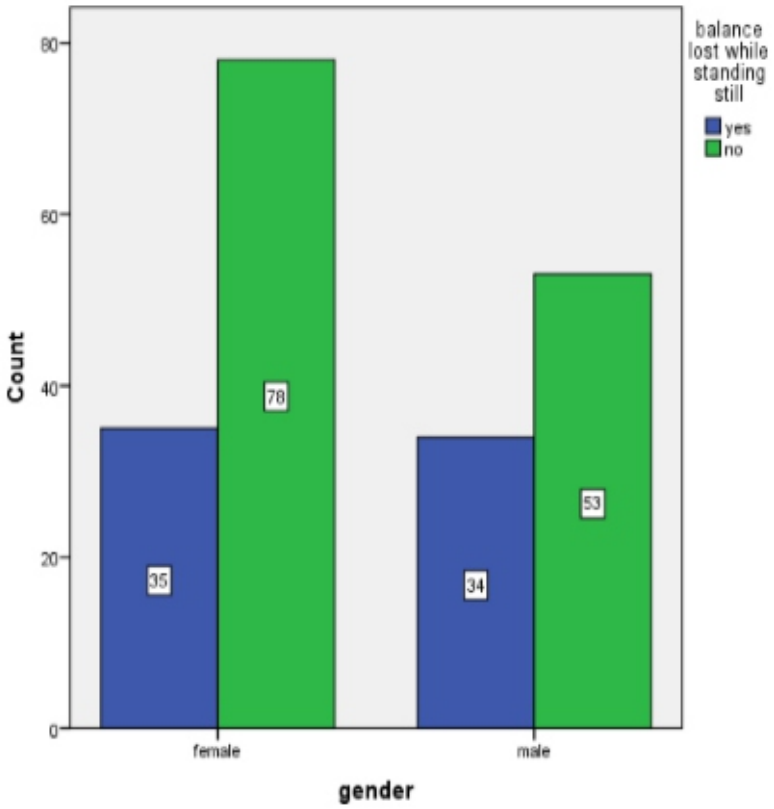



**CROSS TAB. 2: BALANCE LOST WHILE STANDING STILL * GENDER:**

There were total 200 patients in this study among which 69 subjects; 35 females and 34 males, complained of losing balance while standing still. There were 131 subjects; 78 females and 53 males did not lose balance while standing still.

| Balance lost while standing still | Gender | | Total |
|---|---|---|---|
| | female | Male | |
| yes | 35 | 34 | 69 |
| no | 78 | 53 | 131 |
| Total | 113 | 87 | 200 |

**CLUSTER BAR 2: BALANCE LOST WHILE STANDING STILL * GENDER**




**CROSS TAB. 3: BALANCE LOST WHILE STANDING STILL ***

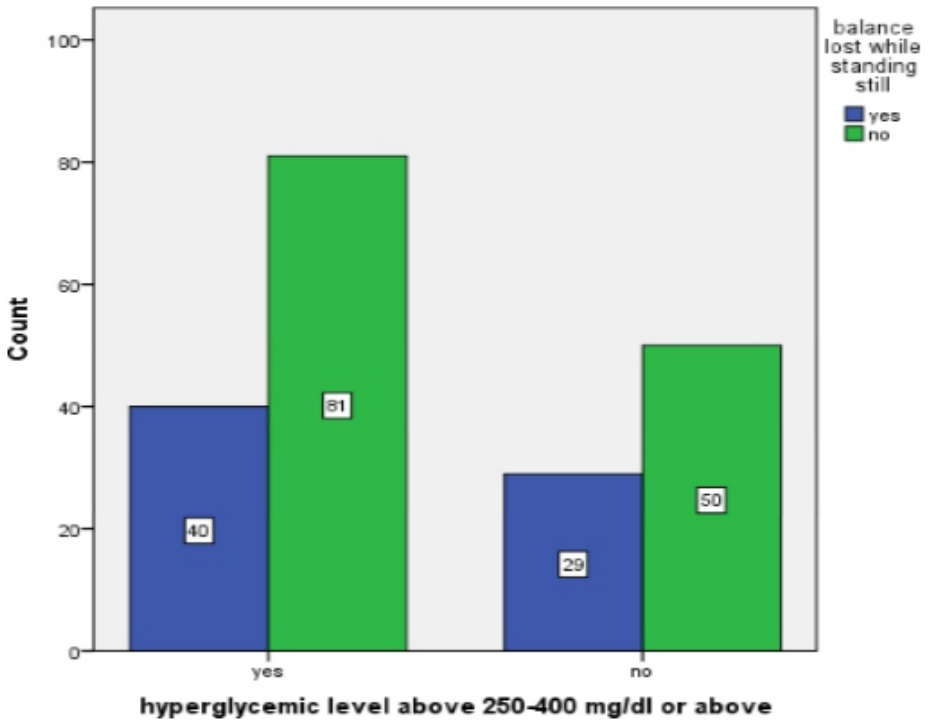
**HYPERGLYCEMIC LEVEL BETWEEN 250-400 mg/dl:**

There were total 200 patients in this study among which 120 patients who had hyperglycemic levels above 250-400mg/dl or above, among them 39 had balance lost while standing still and 81 did not lose balance while standing still. 80 patients who had hyperglycemic level below 250, among them 30 had balance lost while standing still and 50 did not lose balance while standing still.

| balance lost while standing still | hyperglycemic level above 250-400 mg/dl or above | | Total |
|---|---|---|---|
| | Yes | No | |
| yes | 39 | 30 | 69 |
| no | 81 | 50 | 131 |
| Total | 120 | 80 | 200 |

**CLUSTER BAR CHART 3 : BALANCE LOST WHILE STANDING STILL ***

**HYPERGLYCEMIC LEVEL BETWEEN 250-400 mg/dl:**




**CROSS TAB. 4: BALANCE LOST WHILE WALKING ***

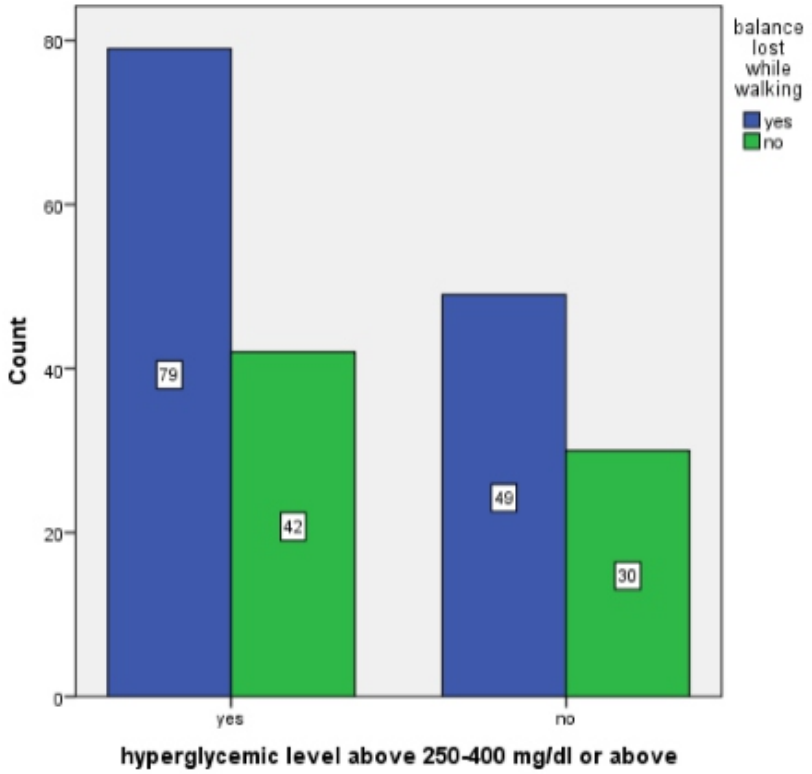
**HYPERGLYCEMIC LEVELS ABOVE 250-400 mg/dl:**

There were total 200 patients in this study among which 120 patients had hyperglycemic levels above 250-400mg/dl or above. Among whom 78 had balance lost while walking and 42 did not lose balance while walking. 80 patients had hyperglycemic levels below 250 out of which 50 had balance lost while walking and 30 did not lose balance while walking.

| balance lost while walking | hyperglycemic level above 250-400 mg/dl or above | | Total |
|---|---|---|---|
| | Yes | No | |
| yes | 78 | 50 | 128 |
| no | 42 | 30 | 72 |
| Total | 120 | 80 | 200 |

**CLUSTER BAR NO. 4: BALANCE LOST WHILE WALKING ***

**HYPERGLYCEMIC LEVELS ABOVE 250-400 mg/dl:**




**RESULTS:**

Study reveals the prevalence of fall and balance problems among patients of diabetes mellitus type 2 and their gender specificity. According to the results obtained; 200 diabetic type 2 subjects were included in this study; among them 56.5 % were females and 43.5% were males, 50% belonged to Abbottabad and 50% belonged to Rawalpindi. 49% used insulin to control their hyperglycemic levels and 51% did not use insulin. 40%(80)used to have hyperglycemic level between 170-250mg/dl and 60%(120) used to have hyperglycemic level above 250 mg/dl. 67.5 % had numbness in legs, 59% had trouble walking up or down inclined surface, 34.5% had problem while standing still, 64% had balance lost while walking, 40.5% had fallen more than once in past year. 74% had light headedness or dizziness. 31% knocked down to unconsciousness. 73% suffered from frequent headaches. 46.5% had dizziness while watching moving object. Sudden changes in position worsened symptoms in 39.5% of the subjects. 31% suffered from head / neck trauma in past. 19.5% ever suffered from stroke. Total 128 subjects had balance lost while walking among them 73 were females, 55 males had balance lost while walking(more females with hyperglycemic levels had balance impairment). 35 females had balance lost while standing still and 34 males had balance lost while standing still. 200 patients included in study, in which there were 80 people with hyperglycemic levels between 170-250mg/dl; out of which 50 had balance lost while walking, which 30 had balance lost while standing still.120 people were with

hyperglycemic level above 250 mg/dl; out of which 78 had balance lost while walking, 50 did not lose balance while standing still.

**DISCUSSION:**

The study is conducted to find out fall and balance problems among patients of diabetes mellitus type 2. This study shows that females had more fall and balance problems than males and also high level of hyperglycemia causes increased fall and balance problems.

Maurer S. M., et.al conducted research in year 2005 on topic, "Diabetes Mellitus is Associated with an Increased Risk of Falls in Elderly, Residents of a Long-Term Care Facility." Over the follow-up period (mean 299 days), 49 participants (35%) experienced a fall. The fall incidence rate for the participants with and without diabetes mellitus was 78% and 30% respectively. The significant unadjusted hazard ratios of fall risk factors included diabetes mellitus, Berg Balance Scale score <45, number of medications, angiotensin- converting enzyme (ACE) inhibitors, hypertension, use of assistive device, inability to independently move a wheelchair, and use of antidepressants with the latter two factors being protective. In multivariate analysis, only diabetes and gait and balance were significantly and independently associated with an increased risk of falls.[13]

David Bruce, et.al conducted a research in year 2015 on topic "Fear of falling is common in patients with type 2 diabetes and is associated with increased risk of falls". Compared to normal glycemic levels those with diabetes had worse mobility (slow timed Up and Go test times: 16.2 versus 4.9%), more fear of falling (24.2 versus 15.1%) and more activity restriction from fear of falling (indoors: 14.0 versus 4.8%), but there was no increase in reported recent falls.[14]

Timar B., et.al conducted a study, „The Impact of Diabetic Neuropathy on Balance and on the Risk of Falls in Patients with Type 2 Diabetes Mellitus: A Cross-Sectional Study" The presence of DN was associated with significant decreases in the BBS score and FES-I score. In the multivariate regression model, they observed that patient"s age, DN severity and depression symptoms acted as independent, significant predictors for the risk of falls in patients with T2DM. [15]

Walley M., et.al conducted research in year 2014 on topic, "Dizziness and Loss of Balance in Individuals with Diabetes: Relative Contribution of Vestibular Versus Somatosensory Dysfunction." According to its results, Clinical examinations identified 1 subject with no sign of neuropathy, 21 with mild neuropathy, 12 with moderate neuropathy, and 3 with severe neuropathy. Twenty-six patients displayed clinical signs of vestibular dysfunction on one or more tests. Quantitative dynamic platform

posturography (DPP) revealed 27 patients with overall substandard equilibrium scores. Of those 27, 25 individuals were substandard in vestibular-derived conditions with normal somatosensory scoring. Five patients were substandard in somatosensory conditions and three of the five were also deficient in vestibular scores indicating a multisystem stability disorder. [16]

A. K. Azidah, et.al conducted a research in year 2012 on topic "Prevalence of Falls and Its Associated Factors among Elderly Diabetics in a Tertiary Center, Malaysia"A total 316 subjects that fulfilled the inclusion and exclusion criteria were approached during study period. However, only 288 subjects consented. Thus, the response rate of the study was 91.1%. The mean age of the study participant was 66.9. Total balance and gait scores among faller group were lower compared to non-faller. Hypertension, retinopathy, peripheral neuropathy, orthostatic hypotension, polypharmacy and hypoglycemia episodes were more common in the fallers compared to non-fallers.[12]

FabianaMagalhães, et.al conducted a research in year 2016 on topic "Differences between genders in relation to factors associated with risk of diabetic foot in elderly persons: A cross- sectional trial."They included 174 elderly people who had no history of stroke and peripheral vascular disease. Risk factors for diabetic foot were older age, presence of calluses and claw toes, insulin use, presence of sensory comorbidities, ulcers, numbness, and stiffness in the feet. Most (58.6%) were female and among them.[17]

**CONCLUSIONS:**

It is concluded that most of subjects with type 2 diabetes mellitus had balance lost while walking or standing still. Frequent headaches, numbness in legs and falls were common among the diabetics. Majority of the population complained of difficulty getting up from chair, balance lost while walking or standing still, frequent headaches, numbness in legs and falls. Diabetic patients with hyperglycemic levels above 250mg/dl had higher prevalence of balance lost while standing still or walking. Females had higher prevalence of fall and balance problems than men.

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# Analysis of Physical Health Status of Faculty and Staff in Jinhua

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## ABSTRACT

*This study attempts to use the physique health test results of faculty and staff as a keyissue, and based on the socio-ecological model, analyzes the socio-ecological factorsaffecting the differences in physical fitness between urban and rural, gender, and differentin-service schools. Methods: The physical and mental health of 15 primary and middleschools in Jindong District, Jinhua City, Zhejiang Province (including 2 junior highschools, 4 primary schools, 4 township junior high schools, 4 township primary schools) and the faculty and staff of Jinhua Campus of Zhejiang Normal University were selected. Using SPSS23.0, the chi-square test, independent sample t-test and one-way variance were used to analyze the national physique health test data of the subjects, and the differences in physique between urban andrural areas and between primary and secondary schools were analyzed. Results: 1)In the comparative analysis of faculty and staff in large, middle and primaryschools, it was found that body shape indicators are not explicit indicators thatdistinguish different school levels. There are significant differences in thephysical function indicators of the faculty and staff of the large, middle and primaryschools. The excellent rate of vital capacity of the university faculty and staff issignificantly higher than that of the primary and secondary school teachers. The percentageof the university faculty and staff is generally higher than that of the primary andsecondary school teachers. 2) In the physical quality index, the grip strength, the sittingbody flexion, the closed eye standing on one leg, and the reaction are dominant indicators. Among them, the grip strength index showed three significant differences among the fourgroups of female faculty and staff. The seated body flexion test results only showedsignificant differences among the male faculty and staff over 40 years old. The differencein the step test index only existed in the primary school faculty and staff. Conclusion: Thephysique of university faculty and staff is significantly better than that of primary andsecondary schools. This study attempts to analyze the causes of differences in physiqueand staff from five levels: individual, family, community, school, and society.*

***Keywords: physical health; faculty and staff; Jinhua City***

## 1. INTRODUCTION

Health means that a person is in good shape in terms of physical, mental and social aspects. [1] Physical health is considered a common-sense definition of health, and physical fitness testing is a common means of assessing physical health. The student's physical fitness test and the national physique health test are important means for the government departments to evaluate the health of the national physique. However, the government and scientific research workers have different concerns about the two. Through CNKI, the “national health” and “student physical health” were used as keywords. The former can only retrieve 3 articles, while the latter has 3,498 searches. At the same time that Europe and the United States have introduced a relatively complete faculty health promotion plan, China's attention to the health of the national physique is relatively low, and domestic scholars have little research on the

physique and health of faculty and staff [2]. Most of the research is aimed at college faculty and staff, and the research on the physical health of teachers in primary and secondary schools can be described as rare. The health of flowers as a motherland should be paid attention to, but as a hard-working "gardener", the physical health of the faculty and staff will directly affect the quality of teaching. Therefore, this study takes the physique health test results of faculty and staff as a key issue, and analyzes the factors affecting the differences in physical fitness between urban and rural areas, gender, and different job-seeking schools.

## 2. RESEARCH METHOD

### 2.1 Subjects

This study selected 15 primary and middle schools in Jindong District of Jinhua City, Zhejiang Province (including 2 junior high schools, 4 primary schools, 4 township junior high schools, 4 township primary schools) and the physical health status of the faculty and staff of Jinhua Campus of Zhejiang Normal University.

**Table 1 Basic information of the research object**

| | | Male | | Female | | total |
|---|---|---|---|---|---|---|
| | | 20-39（Age） | 40-59（Age） | 20-39（Age） | 40-59（Age） | |
| primary school | city | 20 | 13 | 131 | 52 | 216 |
| | rural | 43 | 29 | 161 | 64 | 297 |
| junior high school | city | 10 | 37 | 39 | 41 | 127 |
| | rural | 41 | 68 | 69 | 63 | 241 |
| university | | 184 | 242 | 246 | 236 | 908 |

#### 2.2.1 Data collection

The SPSS23.0 was used to analyze the national physique health test data of the subjects by independent sample t test and one-way ANOVA, and analyzed the differences in physical fitness between urban and rural schools and colleges and universities.

National physique health data mainly reflects the shape, function and quality indicators of the research objects. The items tested included: height, weight, reaction time, grip strength, vital capacity, closed-eye standing, sitting flexion, vertical jump and step index. At the same time, each project is divided into five levels of 1-5 points. [4]

#### 2.2.2 Data analysis

In the data analysis process, the software SPSS16.0 is used.

## 3. RESEARCH RESULTS

### 3.1 Excellent rate of physical test results

According to the "National Physical Fitness Measurement Standards of China", each test is set to a rating of 1-5 points (poor-excellent), and the percentage of each level can be used as a means of evaluating the physical health of the faculty and staff of the large, middle and primary schools. [5, 6] From the overall research results in Table 2, the comprehensive scores of university faculty and staff are higher, generally up to 87.8%, but the comprehensive scores of small and medium-sized faculty and staff are generally below 50%, and there are three groups. Significant difference ( 2=386.03, P<0.05). From the perspective of body shape, the excellent percentage of height and weight of the three groups of teaching staff is higher, more than 70%, and there is no significant difference between the three groups of data by chi-square test. In terms of bodily functions, the vital capacity of primary and secondary school teachers is generally 70.70% and 66.20%, which is quite different from 91.80% of college faculty and staff ( 2=462.53, P<0.05), and the step index is the same. In terms of physical fitness, the three items of push-ups, sit-ups, and vertical jumps generally accounted for a large percentage and high consistency. When the eyes were closed and the reaction was selected, the excellent rate of university faculty in the two projects was better. High, there is a significant difference with primary and secondary schools. The faculty's grip indicators show a higher proportion of general, good, and excellent scores than those in primary and secondary schools.

**Table 2 Comparative analysis of physical fitness evaluation of teachers in large, middle and primary schools**

| Index | Group | Poor | Fair | Average | Good | Excellent | Chi-square test |
|---|---|---|---|---|---|---|---|
| Height | A | 9.40% | | 16.50% | | 74.10% | $\chi^2$=9.96， $P$ |
| standard weight | B | 10.60% | | 16.60% | | 72.80% | ＞0.05 |
| | C | 13.10% | | 15.20% | | 71.70% | |
| | A | 9.40% | 24.40% | 30.50% | 24.20% | 11.50% | $\chi^2$=462.53， |
| Vital capacity | B | 9.50% | 19.80% | 29.40% | 31.00% | 10.30% | $P$＜0.05 |
| | C | 3.40% | 4.80% | 12.80% | 24.20% | **54.80%** | |
| | A | 8.60% | 31.20% | 32.70% | 20.70% | 6.80% | $\chi^2$=108.28， |
| Step index | B | 5.40% | 33.70% | 30.50% | 22.80% | 7.60% | $P$＜0.05 |
| | C | 4.80% | 18.60% | **28.10%** | **29.20%** | **19.30%** | |
| | A | 9.40% | 35.50% | 31.30% | 20.90% | 2.90% | $\chi^2$=24.84， $P$ |
| Grip | B | 7.30% | 32.90% | 29.30% | 22.60% | 7.90% | ＜0.05 |
| | C | 11.30% | 30.90% | 33.30% | 19.00% | 5.50% | |
| | A | 0.90% | 3.90% | 15.80% | 39.40% | 40.00% | $\chi^2$=20.03， $P$ |
| Vertical jump | B | 0.60% | 3.10% | 15.80% | 36.50% | 44.00% | ＞0.05 |
| | C | 3.30% | 3.10% | 11.80% | 36.20% | 45.60% | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | A | 3.20% | 7.90% | 12.70% | 41.30% | 34.90% | $\chi^2$=9.97， $P$ |
| push ups | B | 5.90% | 5.90% | 17.60% | 37.30% | 33.30% | ＞0.05 |
| | C | 7.90% | 13.00% | 19.80% | 25.40% | 33.90% | |
| | A | 1.00% | 2.40% | 14.70% | 34.60% | 47.30% | $\chi^2$=8.87， $P$ |
| Sit-ups | B | 0.90% | 0.00% | 13.90% | 35.20% | 50.00% | ＞0.05 |
| | C | 0.40% | 2.70% | 13.50% | 41.70% | 41.70% | |
| Sitting body | A | 12.30% | 23.60% | 27.80% | 24.00% | 12.30% | $\chi^2$=87.94， $P$ |
| flexion | B | 14.70% | 23.10% | 27.60% | 22.60% | 12.00% | ＜0.05 |
| | C | 6.90% | 15.10% | 22.90% | **31.00%** | **24.10%** | |
| | A | 0.80% | 12.70% | 23.40% | 36.60% | 26.50% | $\chi^2$=150.02， |
| Balance test | B | 1.60% | 9.20% | 24.80% | 38.30% | 26.10% | $P$＜0.05 |
| | C | 0.40% | 4.00% | 14.20% | 29.20% | **52.20%** | |
| | A | 1.20% | 6.60% | 22.00% | 42.10% | 28.10% | $\chi^2$=386.03， |
| Reaction test | B | 0.80% | 3.50% | 25.60% | 46.50% | 23.60% | $P$＜0.05 |
| | C | 0.00% | 0.70% | 5.30% | 24.00% | **70.00%** | |
| | A | 30.90% | 34.40% | 31.80% | 2.90% | | $\chi^2$=847.03， |
| Overall | B | 28.50% | 37.00% | 31.20% | 3.30% | | $P$＜0.05 |
| | C | 0.20% | 12.00% | 24.30% | **63.50%** | | |

**Note: A:primary school;B:junior high school;C:university**

### 3.2 Urban-rural differences in the average physical fitness of primary and secondary school teachers and staff

It can be seen from Table 3 that the results of the physical test of the 20-39-year-old urban and rural primary school teachers can be seen that the step index of urban male faculty and staff is significantly higher than that of the rural (t=2.01, P<0.05), and the push-ups are presented. Similar differences (t = 2.09, P < 0.05). The grip strength of urban female faculty and staff was significantly higher than that of rural faculty and staff (t=2.44, P<0.05), and the response time test was superior to rural female faculty and staff (t=-3.14, P<0.05). It can be seen from Table 4 that the grip strength of female junior high school teachers in the 20-39-year-old city is significantly higher than that of rural faculty and staff (t=2.85, P<0.05). There is no urban-rural difference in other projects.

Tables 5 and 6 show the results of physical fitness tests of 40-59-year-old urban and rural primary and junior high school faculty members. The male faculty and staff in urban primary schools have significantly lower sitting strength than rural areas (t=3.80, P<0.05), while urban junior high school male faculty and staff The flexion of the sitting position was significantly larger than that of the rural area (t=3.34, P<0.05), and the response time was significantly better than that of rural teachers (t=-2.16, P<0.05). The step index of female faculty and staff in urban primary schools was significantly smaller than that in rural areas (t=-2.22, P<0.05), while the female faculty in junior high school was significantly higher than female faculty members (t=-2.25, P<0.05).

**Table 3 Difference analysis of physical fitness test between 20 and 39-year-old urban and rural primary school teachers**

| | Male | | Female | |
|---|---|---|---|---|
| | City | Rural | City | Rural |
| Height | 172.12±7.39 | 173.58±5.98 | 159.14±4.79 | 159.05±5.1 |
| Body weight | 74.43±9.32 | 73.38±9.71 | 54.39±5.11 | 54±8.41 |
| BMI | 25.15±3.00 | 24.37±3.11 | 21.5±2.05 | 21.31±2.88 |
| Vital capacity | 4164.75±790.24 | 4203.23±689.88 | 2566.67±534.38 | 2531.01±535.93 |
| Step index | **57.26±7.7** | **53.28±7.11*** | 55.35±6.39 | 56.68±9.38 |
| Grip | 46.43±7 | 45.58±6.94 | **27.83±4.19** | **26.6±4.36*** |
| Vertical jump | 46.5±9.88 | 43.78±8.84 | 26.8±5.24 | 26.38±4.73 |
| push ups | **35.7±12.72** | **28.79±11.94*** | | |
| Sit-ups | | | 27.45±9.38 | 28.2±9.26 |
| Sitting body flexion | 11.34±6.75 | 9.37±9.35 | 10.86±7.7 | 11.42±7.39 |
| Balance test | 66.45±45.47 | 55.98±45.6 | 57.13±33.01 | 58.28±62.14 |
| Reaction test | 0.4±0.04 | 0.41±0.04 | **0.45±0.07** | **0.47±0.07**** |

Note: * indicates a significant difference between urban and rural areas, $P < 0.05$, the same below.

**Table 4 Difference analysis of physical fitness test of 20-year-old 39-year-old urban and rural junior high school teachers**

| | | Male | Female | |
|---|---|---|---|---|
| | City | Rural | City | Rural |
| Height | 168.55±5.63 | 171.24±6.35 | 159.13±4.96 | 158.05±4.93 |
| Body weight | 69.52±6.57 | 71.63±14.31 | 54.64±5.61 | 54.98±7.91 |
| BMI | 24.57±2.98 | 24.36±4.33 | 21.62±2.43 | 22.01±3.05 |
| Vital capacity | 3829±838.88 | 3660.27±933.73 | 2605.74±441.48 | 2544.81±446.52 |
| Step index | 53.47±8.6 | 55.82±8.89 | 53.41±5.62 | 55.51±6.56 |
| Grip | 43.38±5.66 | 46.31±7.13 | **28.83±4.82** | **26.19±4.57*** |
| Vertical jump | 41.35±9.53 | 40.87±9.52 | 26.15±5.31 | 26.68±3.8 |
| push ups | 26.5±9.54 | 28.73±12.27 | | |
| Sit-ups | | | 25.92±8.27 | 27.09±9.37 |
| Sitting body flexion | 7.58±9.49 | 7.8±7.2 | 10.44±7.2 | 10.19±7.49 |
| Balance test | 51.8±41.21 | 59.88±90.94 | 60.69±41.41 | 60.68±91.88 |
| Reaction test | 0.43±0.07 | 0.43±0.05 | 0.46±0.07 | 0.47±0.06 |

**Table 5 Difference Analysis of Physical Fitness Tests of 40-59-year-old Urban and Rural Primary School Teachers**

| | Male | | Female | |
|---|---|---|---|---|
| | City | Rural | City | Rural |
| Height | 169.5±3.95 | 167.2±4.48 | 157.24±5.11 | 156.71±4.91 |
| Body weight | 72.52±10.75 | 69.72±6.6 | 56.12±6.2 | 56.59±9.04 |
| BMI | 25.19±3.35 | 24.94±2.06 | 22.67±1.96 | 22.99±3.24 |
| Vital capacity | 3574.15±859.7 | 3104.07±749.65 | 1936.81±676.3 | 2046.73±520.41 |
| Step index | 53.5±9.03 | 55.96±7.65 | **55.88±7.72** | **59.59±9.86*** |
| Grip | 45.15±6.46 | 42.81±5.96 | 27.9±6.69 | 27.99±4.88 |
| Sitting body flexion | **-1.96±8.01** | **7.69±7.44*** | 6.53±9.71 | 7.66±8.11 |
| Balance test | 25.31±22.39 | 22.45±17.87 | 30.96±29.44 | 38.02±42.81 |
| Reaction test | 0.51±0.04 | 0.48±0.08 | 0.5±0.12 | 0.52±0.09 |

**Table 6 Difference analysis of physical fitness test of 40-59-year-old urban and rural junior high school teachers**

| | 男 | | 女 | |
|---|---|---|---|---|
| | 城市 | 乡村 | 城市 | 乡村 |
| Height | 170.35±5.01 | 168.75±4.78 | 159.42±6.06 | 157.67±4.89 |
| Body weight | 72.74±7.56 | 70.31±7.47 | 59.76±7.15 | 57.05±7.78 |
| BMI | 25.04±2.11 | 24.71±2.6 | 23.52±2.48 | 22.93±2.86 |
| Vital capacity | 3440.97±956.28 | 3262.12±759.77 | 2129.2±673.5 | 2325.32±487.67 |
| Step index | 57.99±6.83 | 56.72±9.03 | 58.73±10.86 | 60.46±10.12 |
| Grip | 44.45±6.27 | 45.61±6.12 | **30.47±7.14** | **27.86±4.67*** |
| Sitting body flexion | **9.22±9.22** | **3.58±9.05*** | 8.15±9.00 | 8.36±8.56 |
| Balance test | 39.46±27.53 | 31.74±24.47 | 29.73±25.85 | 31.57±23.87 |
| Reaction test | **0.46±0.06** | **0.5±0.09*** | 0.52±0.08 | 0.52±0.1 |

## 4. ANALYSIS OF RESEARCH RESULTS

### 4.1 Analysis of explicit indicators of physique health differences among teaching staff

The study compares the excellent rate of indicators and the average of indicators in different groups by establishing large, middle, and primary schools, urban and rural areas, and age groups. In the comparative analysis of teachers and staff in large, middle, and primary schools, it is found that body shape indicators are not a different school. Horizontal dominant indicators; there are significant differences in the physical function indicators of the faculty and staff of the large, middle and primary schools, but the excellent rate of vital capacity of the university faculty and staff is significantly higher than that of the primary and secondary school faculty, and the university faculty's step test score is significantly higher than the above. Teaching staff in primary and secondary schools.

Grip strength, sitting body flexion, reaction time, push-ups, and step tests are dominant indicators in urban-rural differences analysis. Among them, there are three significant differences in the grip strength index among the four groups of female faculty and staff. The sitting body flexion test results

only have significant differences among the male faculty and staff over 40 years old. The difference in the step test index only exists in primary school.

The factors affecting the physical health of faculty and staff can be divided into four aspects: genetic, environmental, social and behavioral. [7] The irreversibility of heredity determines that we mainly analyze the three aspects of environment, society and behavior in the process of inquiry. In the three aspects of environment, society and behavior, behavior is directly related to physical health, while environment and society are the main aspects that restrict behavior development. The study analyzes the factors that distinguish the physique and health of teachers and staff from five aspects: individual, family, community, school and society.

### 4.2 Analysis of the factors influencing the differences in physical fitness of teaching staff

#### 4.2.1 Individuals and families

From an individual perspective, age, gender, education, cognition, and family care all have an impact on individual health. At the household level, the physical health and exercise behavior of spouses and children will have a certain impact on their physical health [3]. Some studies [8] pointed out that the time spent in the field of life is closely related to sports participation, which is one of the reasons why the comprehensive physical quality evaluation of university teachers is significantly higher than that of primary and secondary schools. In the survey of faculty and staff of elementary school students over 40 years old, the physical flexibility of male teachers in urban areas is lower than that in rural areas. The mental function of urban female faculty and staff is lower than that in rural areas. This may be due to the lower work pressure of rural faculty and staff. At the same time, the teaching burden of primary school faculty and staff is higher than that caused by junior high school faculty and staff [9]. At the same time, the physical health of the faculty and staff has a strong gender specificity. In this study, the significant difference in the grip index is only between women, and the female faculty and staff in the city are more than the rural. The reason may be the rural female faculty. Have to spend more time to care for the family and children. In addition, studies have shown that the higher the level of education, the higher the frequency of participation in fitness activities [10]. Behind it is the result of differences in their own health concerns, economic and social status.

#### 4.2.2 Community and school

The communities in which faculty and staff live generally surround the school. They are characterized by convenience and comfort. The nature of the work of the faculty and staff determines that their living areas must be distributed around the school. The residences of most township faculty and staff are

villages owned by township schools, while the residences of faculty and staff in urban schools are mostly neighborhoods near the school. The natural environment in which the city and rural faculty live is relatively consistent, but the built environment (construction, transportation, greening, sports) Facilities vary widely, and studies have confirmed that a quality built environment is more conducive to promoting people's physical health [11]. At the same time, the natural environment has a significant impact on health. Environmental pollution can cause cognitive impairment in the elderly [12], and environmental pollution can also lead to health inequalities [13]. The difference between school and community sports facilities will directly affect the faculty's sports behavior. At the same time, the complete teaching activities of colleges and universities and the physique health test of faculty and staff also promote the healthy development of university faculty and staff to a certain extent.

4.2.3 Society

The introduction of the social environment and policies and regulations can effectively change the faculty's athletic behavior and enhance their physical health. At the same time, the evolution of urbanization and socialization will inevitably have a certain impact on the physique and health of faculty and staff. The rapid urbanization process will lead to the housing pressure and life pressure of faculty and staff. And faculty and staff of different ages and different teaching stages may have different social pressures. Young teachers may have burdens such as insufficient teaching skills, heavy teaching tasks, and high pressures on life, which may cause them to pay little attention to their physical health; middle age Teachers will face pressure from professional titles and children's education; older teachers will face pressure from their children's work and retirement, which will lead to a decline in their physical fitness.

## 5. SUMMARY

To enhance the physique and health of faculty and staff, and to improve the efficiency of faculty and staff, it is necessary to strengthen the construction of faculty and conditions. From the five levels of individual, family, community, school and society, we can better understand the difference in physical fitness of teachers and staff caused by the difference between urban and rural, age, gender and social status.

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# Effectiveness of Structured Teaching Programme Regarding Knowledge on Newborn Care Among Primimothers at Selected Villages of Haryana

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## ABSTRACT

*Newborn babies have a right to survive and grow into child-hood, and to experience life to their full potential. Their healthy start in life is a shared responsibility of the family, community, and government. Across the lifespan, a human being faces the greatest risk of mortality during birth and the first 28 days of life—the neonatal period. Three quarters of neonatal deaths take place in the first seven days, the early neonatal period. Ironically enough, most of these are preventable. Neonatal mortality is one of the major causes of concern with newborns all over the world, especially developing and underdeveloped countries. Despite some remarkable improvement in neonatal health in recent years, the high mortality rate remains unchanged in many countries. Of the 10 million babies born every year approximately 4 million infants die during first week, 8 million during first year and around 10 million within 5 years of their life. Great efforts have been made to improve health of child around the world but mortality rates are still high in neonates. Most neonatal deaths can be avoided through simple, affordable interventions, especially in areas with weak health systems and high rates of neonatal mortality. Outreach and family-community care, health education is needed to improve the health of the Newborn.*

## INTRODUCTION

Newborn care refers to the essential care provided to the newborn baby by the mother or by the care provider such as, breast feeding, maintaining body temperature, care of the cord, care of the eyes, and prevention of infection and injuries. The first week after birth is a time of major metabolic and physiological adaptation for newborn infants. The early life all newborn try to adapt to the external environment. So, newborns need a special care and intensive monitoring and support during this critical period of adaptation. Care of the children had always traditionally been the forte of mothers irrespective of education, income and social class differences. The important task of motherhood is to fulfill physical, emotional, social, intellectual and moral needs of children. There is no doubt that a mother plays an important role in this regard.

According to the report, about 8,02,000 infant deaths were reported in India in 2017 the lowest in five years, according to the United Nations Inter Agency Group for child Mortality Estimation (UNIGME), it also reported that 6,05,000 neonatal deaths were reported in India in 2017. In 2016, Indian Infant mortality rate was 44 per 1000 live births. In 2016, infant mortality rate for Haryana was 33 per 1000 live births. Infant mortality rate of Haryana fell gradually from 60 per 1000 live births in 2005 to 33 per 1000 live births in 2016. It is possible to increase prenatal survival and quality of human life through prompt and adequate management of newborn.

**OBJECTIVES**

1. To assess the level of knowledge of Primi mothers on newborn care before structured teaching Programme
2. To assess the level of knowledge of Primi mothers on newborn care after structured teaching Programme

**REVIEW OF LITERATURE**

P. Latha(2017) Conducted a study on effectiveness of structured teaching Programme on newborn care among primi mothers at government hospital ,Telangana. The pre-test, showed that, 23(77%) were had average knowledge, followed by 4(13%) were had below average knowledge and 3(10%) were had above average knowledge regarding newborn care. In post- test,16 (53%) were had average knowledge and 14(47%) had above average knowledge none of them had below average knowledge regarding newborn care. The pre test mean was 15.2 and standard deviation was 3.75. And the post test mean was 20.6 and standard deviation was 2.7. The calculated value was greater than table value. So, it is significant at $p<0.05$ level. The study showed that there was a significant difference in the knowledge level after STP, Hence, the research hypothesis is accepted.

Ms. SheelaKet.,al.,(2018) conducted a study on effectiveness of structured teaching Programme on the knowledge regarding newborn care among primi mothers. The study was conducted at GovtDoon medical, Hospital Dehradun, UK. 50 Primi mothers were selected as subjects by convenient sampling technique. Data were collected using structured questionnaire in 2 parts. Part A includes the questions regarding demographic characteristics & Part B includes the knowledge questionnaire regarding general newborn care in newborns. The study showed that out of 50 subjects only 10% mothers were having average knowledge & 38% mothers were having very poor knowledge& whereas maximum mother 52% were having poor knowledge. Pre-test mean score was 10.08.After intervention 90% primi mothers scored good & only 10% mothers scored in average & the interesting was that no one mother falled in poor knowledge category. The post–test mean was 25.08. Knowledge was found significantly higher than the pre- test Mean score. As evidence from “t” value of 22.01 for df at <0.05 level of significance.

RashmiNegi,et.,al., (2017) conducted a study on Effectiveness of Structured Teaching Programme on Newborn Care among Primi Gravid Women in a selected hospital at Delhi. The result showed that in the overall knowledge 20 (33.3%) primi gravid women gained moderately adequate knowledge and 40 (66.7%) primi gravid women gained adequate knowledge and no one had inadequate knowledge. The association between educational status and knowledge of primi gravid women at $p< 0.001$ level. It showed that educated women had adequate knowledge in post test

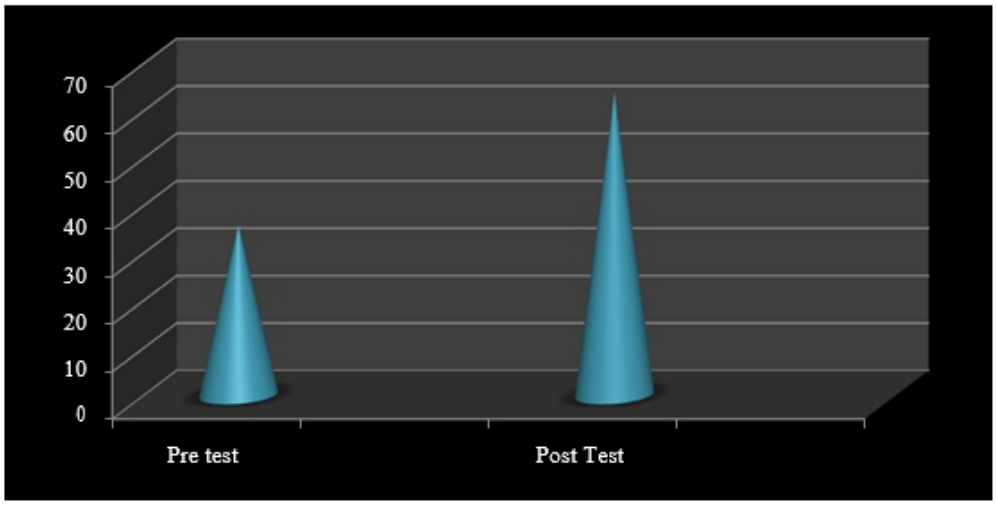
## METHODOLOGY

One group Pretest Post design was adopted. A Sample of 50 primi gravid women who met the inclusion criteria was selected for the study. Convenient sampling technique was used for the study. This section consists of socio demographic data of the individuals and another section consists of questionnaire regarding maintenance of personal hygiene, Thermoregulation, breast feeding, immunization and umbilical cord care. Data was collected after obtaining permission from the medical officer. Informed consent was taken from the subjects. Data was collected with a structured questionnaire. The structured teaching programme contains information regarding maintenance of personal hygiene, breast feeding immunization, thermoregulation and umbilical cord care. Post test was conducted after a period of seven days using the same structured questionnaire. The data was analysed by using descriptive and inferential statistics.

## RESULTS

Comparison of level of knowledge ofPrimi mothers on newborn care before and after structured teaching Programme

**Figure : No: 1 Comparison of level of knowledge of Primi mothers regarding newborn care before and after structured teaching Programme**




## DISCUSSIONS

The overall findings of the present study showed that majority of the primi gravid women had inadequate knowledge regarding maintenance of personal hygiene, thermoregulation, breast feeding, immunization and umbilical cord care. This study also showed that the overall knowledge had increased after structured teaching programme and STP was effective. This type of educational programme can bring a change in primi gravid women's knowledge and create awareness in caring newborn effectively. The Pretest knowledge of the Primigravida mothers before structured teaching

Programme was 36% and Post test knowledge of the Primigravida mothers before structured teaching Programme was 64%.

## CONCLUSION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# Effectiveness of Valsalva Maneuver on Pain Perception Among Patients Undergoing Intravenous Cannulation in Indira Gandhi Medical College and Hospital Shimla, Himachal Pradesh

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## ABSTRACT

***Background:*** *Intravenous cannulation is most common invasive procedure, used in the healthcare setting for drug administration which causes pain and distress to the recipient. Past experiences about intravenous cannulation may leads to avoidance or postpone needed medical care. Valsava maneuver is a most effective non-pharmacological and non-invasive procedure which is used to reduce the pain of the patient during intravenous cannulation.*

***Aim:*** *A quasi-experimental study was conducted to evaluate the effectiveness of Valsalva maneuver on pain perception among patients undergoing intravenous cannulation in Indira Gandhi Government Medical College and Hospital Shimla, Himachal Pradesh.*

***Methodology:*** *A quasi experimental with post-test only control group design was used to conduct the present study. Purposive sampling technique was used to select the sample size of 50 adult patients who were between the age group of 21-60 years admitted in medical ward, surgical ward, and oncology unit those are undergoing for intravenous cannulation at Indira Gandhi Medical College and Hospital Shimla, Himachal Pradesh. The tools of study were demographic variables and numerical pain rating scale.Result: Data analysis was done by descriptive and inferential statistics. In experimental group majority of study subjects 80% had mild pain whereas in control group majority of study subjects 72% had moderate pain. Mean pain score and standard deviation of experimental group as 2.56±1.227 and of control group as 4.56±1.294.The calculated t value as 5.608 at significance level of ≤ 0.05 and df (48) hence the calculated t value is greater than the tabulated „t" value which indicates that intervention was effective in experimental group. The above findings shows that the intervention was effective in experimental group. There was no significant association of post-test pain score with any of the selected associated variables in the experimental and control group.*

***Conclusion:*** *The study concludes that the Valsalva maneuver is non-invasive, non- pharmacological and effective method to reduce pain associated with intravenous cannulation.*

***Keywords:- Pain, Intravenous cannulation, Valsalva maneuver***

## INTRODUCTION

Pain is an uncomfortable phenomenon. It is one of the factors which interfere with the quality of life of the people.[1] Pain is derived from Greek word poine, which means penalty or punishment.[2] According to The International Association of Study, "Pain is an unpleasant sensory and emotional experience associated with actual and potential tissue damage".[3]

In a hospital setting, patients experience pain because of different causes. In this regard, the American Pain Society classifies pain as the fifth vital sign which emphasizes the importance of pain and increases the awareness of health-care professionals about its control. Millions of people worldwide suffer from pain without adequate treatment every year. One of the main reasons is diagnostic-therapeutic procedures.[4]

The exposure to noxious stimuli like pain results in the release of neuro transmitters which may surround pain fibers, causing inflammatory responses. The pain fibers enter the spinal cord and travel one of several routes until ending with in the gray matter of the spinal cord. There by transmitting the pain. Nerveimpulses resulting from painful stimulus travels along afferent and efferent peripheral nerve fibers.

Peripheral intra venous cannulation is one of the most commonly performed invasive clinical procedures in the hospitalized patients. Most clients are fearful of intravenous cannulation pain. Past experiences about intravenous cannulation may leads to avoidance or postpone needed medical care.

The anticipation of pain about intravenous cannulation is generally under estimated and unappreciated. During intravenous cannulation patients may experience moderate to severe pain.[5]

Nonpharmacological interventions include nursing activities that can relieve pain. Such interventions are effective, simple, and safe and do not require specific time and costly equipment.

Valsalva maneuver is a non-invasive, non-pharmacological and effective method to reduce pain associated with peripheral intravenous cannulation. It is one of the less expensive, easily performed method.

This technique is named for Antonio Maria Valsalva, the 17$^{th}$ Century physician and anatomist. The Valsalva maneuver is performed by moderately forceful attemped exhalation against closed airway. It can be performed by straining or coughing. Blowing forcefully in to rubber tubing connected to aneroid BP apparatus and raising the needle of the dial up to 20 points for a period of 20 seconds can also induce this maneuver.[6]

During Valsalva maneuver contraction of thoracic cage compresses lung and causes increase in intrathoracic pressure resulting in compression of vessels within the chest and in turn stimulates vagus nerve and vagus nerve in turn activates the bar receptor. The activation of either the cardio pulmonary

bar receptor reflux or sin aortic bar receptor reflux induces antinociception. Through Valsalva bar receptors activates and control activity of sympathetic system and reduce pain.[7]

In conclusion, it is found that intravenous cannulation is most common procedure, used in the healthcare setting which causes pain and distress to the recipient.Various studies conclude that Valsalva maneuver helps in reduction of pain during intravenous cannulation.

**OBJECTIVES**

1. To assess the level of pain during intravenous cannulation among patient in experimental group and control group.
2. To compare the effectiveness of Valsalva maneuver on pain perception among patients undergoing intravenous cannulation between experimental and control group.
3. To find out association of the level of pain during intravenous cannulation among patient in experimental and control group with selected demographical variables.

**METHODOLOGY**

A quantitative research approach and quasi-experimental research design was used. Data was collected from Indira Gandhi Medical College and Hospital Shimla Himachal Pradesh. 50 adult patients between the age of 21-60 years, admitted in medical ward, surgical ward, and oncology unit those were undergoing for intravenous cannulation selected by using purposive sampling technique. 30 study subjects were selected in experimental group and 30 in control group.

The data collection tool used for the study was demographic variables and numerical pain rating scale. The demographic variables were age, gender, education, activity level, residence and previous experience of intravenous cannulation.[10]point numerical pain rating scale was used to assess the level of pain during intravenous cannulation. The content validity of the tool was established after the consultation with experts in nursing and medical fields. Reliability was not sort as the tool i.e. standardized one.

The study was conducted after obtaining the formal permission from the authorities, the purpose of the study was explained and informed consent was obtained. Confidentiality was assured to all the samples.

In experimental group, demographic data of subjects was taken by interview schedule. Supine position was given to experimental group and intervention was given to subjects by instructing them to blow

forcefully into the rubber tubing connected to aneroid BP apparatus and raising the needle of the dial up to 20 mm hg for a period of 20 seconds. Twenty seconds laters, intravenous cannulation was performed with 20 G intravenous cannula, after cannulation with the help of numerical pain rating scale the client was asked to notify the level of pain form score 1-10.

In control group, demographic data of the subjects was taken similarly by interview schedule. Supine position was given to control group and after applying tourniquet, cannula was inserted and immediately after cannulation with the help of numerical pain rating scale the client was asked to notify the level of pain from score 1-10. Numerical pain rating scale was used to evaluate the effectiveness of Valsalva maneuver on pain perception among patients undergone for intravenous cannulation.

Data was analysed by descriptive and inferential statistics i.e. frequency, percentage, mean, mean percentage, standard deviation, unpaired "t" test and chi square to determine the association between level of pain during intravenous cannulation with selected variables.

**RESULT**

The collected data was analysed by using descriptive statistics and the study findings are organized under following sections.

**SECTION-A:** Finding related to distribution of socio-demographic variables in term of frequency and percentage.

In experimental group majority of the study subjects 14(56%) were in the age group of >50-60 years, 13 (52%) were male, 13 (52%) were Primary/ Middle, [16] (64%) were sedentary workers, 21 (84%) were from rural area and 10 (40%) had previous experience of intravenous cannulation twicely.

In control group majority of study subject 11(44%) were also in the age group of >50-60 years, 13(52%) were female, 13(52%) were Primary/ Middle, 18(72%) were sedentary worker, 19(76%) were also from rural area and 8(32%) had previous experience of intravenous cannulation more than three times.

**SECTION-B:** Findings related to level of pain score during intravenous cannulation among patients in experimental group and control group.

In experimental group majority of study subject 20(80%) had mild pain whereas in control group majority of study subject 18(72%) had moderate pain.

**Table 1 Frequency and Percentage of Post Numerical Pain Rating Scale (NPRS) Score in Experimental Group and Control Group.**

**N=50**

| MEASURING CRITERIA FOR POST NPRS SCORE | | |
|---|---|---|
| CATEGORY SCORE | EXPERIMENTAL | CONTROL |
| | POST NPRS ($n_1$ = 25) (f)% | POST NPRS ($n_2$ = 25) (f)% |
| SEVERE PAIN (7-10) | 0(0%) | 2(8%) |
| MODERATE PAIN (4-6) | 5(20%) | 18(72%) |
| MILD PAIN (1-3) | 20(80%) | 5(20%) |
| NO PAIN (0) | 0(0%) | 0(0%) |

**Maximum Score = 0**

**Minimum Score = 10**

Table 1 depict in experimental group majority of study subject 20(80%) had mild pain followed by 5(20%) had moderate pain, 0(0%) had severe pain, 0(0%) had no pain whereas in control group majority of study subject 18(72%) had moderate pain followed by 5(20%) had mild pain, 2(8%) had severe pain, 0(0%) had no pain. Hence, it was found that maximum study subjects from experimental group 20(80%) had mild pain and in control group maximum study subjects 18(72%) had moderate pain.

**SECTION-C:** Finding related to comparison of post-test pain scores between experimental group and control group.

**Table 2 Comparison Between the Group with Unpaired 't' Test regarding Effectiveness of Valsalva Maneuver on Pain Perception During Intravenous Cannulation.**

**N=50**

| Unpaired t Test | | N | Mean Score | Mean % | S.D. | MD | Unpaired Test | df | P Value | Table Value at 0.05 |
|---|---|---|---|---|---|---|---|---|---|---|
| POST NPRS Score | EXPERIMENTAL | 2 | 2.56 | 25.60 | 1.2 | 2 | 5.608* | 4 | <0.00 | 2.011 |
| | | 5 | | | 27 | | | 8 | 1* | |
| | CONTROL GROUP | 2 | 4.56 | 45.60 | 1.2 | | | | | |
| | | 5 | | | 94 | | | | | |

**Maximum Score=0**

**Minimum Score=10**

***Significant at ≤ 0.05 Level of Significance**

Table 2 shows the mean pain score and standard deviation of experimental group as 2.56±1.227 and of control group as 4.56±1.294. The mean difference of intravenous cannulation pain score of experimental group and control group was 2. This indicates that the mean pain score of experimental

group was lower than the mean pain score of control group. The calculated t value as 5.608 at significance level of ≤ 0.05 and df (48) . Hence, the calculated t value is greater than the tabulated „t" value which indicates that intervention was effective in experimental group.

**SECTION-D:** Finding related to association of level of pain during intravenous cannulation among patient in experimental and control group with selected demographical variables.

Chi-square test used to associate the level of intravenous cannulation pain and demographic variables such as age, gender, education, activity level, residence, previous experience of intravenous cannulation. There was no significant association between the level of pain score and selected demographic variables in both groups.

## CONCLUSION

**On the basis of findings of the present study, the following results were drawn:**

Intravenous cannulation is one of the most common invasive clinical procedure done in the hospitals for drug administration and because of patients anxiety and fear concerning pain of needles may prevent them from seeking health care. In experimental group majority of study subjects had mild pain whereas in control group majority of study subjects had moderate pain. Valsalva maneuver is less expensive, safe, non-invasive, non-pharmacological and effective method. It was found to be an effective nursing intervention in reducing pain perception among adult patients during intravenous cannulation. There was no significant association between the level of pain score and demographic variable such as age, gender, education, activity level, residence, previous experience of intravenous cannulation.

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# Delay in Initiation of Cancer Treatment Among Rural Population: An Indian Scenario

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## ABSTRACT

*The study is about level of delays during the early diagnosis as well as initiating the cancer treatment in rural areas of country and its impact. Unhealthy diet and poor lifestyle may cause cancer and increases the chances to get many chronic diseases. There are three levels of delay between the initial diagnosis and treatment gets started. Late treatment initiation could increase the staging of disease and have poor after treatment results. It is evident that the various reasons behind the delay, such are lack of awareness, financial problems, travelling problem, accompanying problem, etc.*

***Key Words: Cancer, Level of delay, Rural Area, Initiation.***

## INTRODUCTION:

Cancer stands second in causing mortality worldwide after cardiovascular diseases.[1,2] About 9.6 million deaths out of total world death was caused due to cancer in 2018.[3] According to Indian Council for Medical Research (ICMR) 2016, India had nearly around 1.4 million of cancer patients.[4] According to GLOBOCAN 2018, there were 11, 57,294 new cancer cases diagnosed in India. Among them, 7, 84,821 were died till now due to cancer and 22, 58,208 people are living with cancer. Most common cancers, such as breast, oral, cervical, and gastric and lung cancers are prevalent in India. [5] Cancer incidence, mortality and disability adjusted life years (DALYs) has increased from 1990 in India. The incidence of cancer case increased from 548,000 in 2012 to 1,069,000 in 2016. The rate of mortality was increased from 112.8% and DALYs wasincreased from 90.9% from 2012 to 2016. A large proportion of cancer incidence was found in Kerala, Mizoram, Haryana, Delhi, Karnataka, Goa, Himachal Pradesh, Uttarakhand and Assam.[2]

Lifestyle of an individual e.g. tobacco, alcohol consumption, poor dietary pattern and lack of physical activities are considered as risk factors for developing cancer among people. Tobacco use either in chewing or smoking will be responsible for about 40%-50% of all cancers in men and about 20% of cancer in women. Poor dietary patterns, such as excessive consumption of red chillies and spices, red meat consumption, fried food, alcohol use etc. will account for about 10%-20% of cancer.[6] Unhealthy diet pattern also includes the consumption of 'junk food', such as candy, bakery goods, ice cream, salty

snakes and soft drink, which contains less or no nutritional value but lots of calories, salt, and fats.[7] An unhealthy diet is one of the major risk factors in causing chronic diseases, including cardio-vascular diseases, cancer, diabetes, hypertension and other conditions associated to obesity or over weight.[8]

There is a decrease in physical activities with urbanization, increasing sedentary nature of work, changing means of transportation and the adoption of opulent life style.[6,9] Obesity (BMI of ≥ 30kg/m2) or overweight can increase the risk of cancer like non-hodgkin's lymphoma, leukaemia, multiple myeloma, renal cancer, colon cancer, rectum, breast (post-menopausal women) cancer etc. The obesity is responsible for 8% cancers in both male and female (male account 10% & female 6% out of total). Between 35%-50% of cancer cases can be reduced through controlling these potential modifiable factors.10 World Health Organization (2018) has recommended to adopt healthy dietary pattern including: eating more fruit, vegetables, legumes, nuts and grains; lessen the amount of salt, sugars, fat and whole purpose flour (Maida); and engage in regular physical activity.[9]

National Cancer Registry Programme has started to study magnitude and pattern of cancer in 1981. Most of registries are functioning and focusing in urban areas. The actual rate of cancer is underreported in rural areas of India. Hence, it is difficult to determine the actual trend of cancer in India.[2, 11, 12] The paucity of adequate data on cancer and complex pathogenesis of disease bring more complexity in determining the pattern of cancer among rural people.[11] About 70% of Indian population resides in rural area, yet around 95% health facilities are found in urban areas. The incidence of cancer cases and mortality rate vary in urban and rural areas. As compared to urban areas, incidence of cancer cases is low in rural areas, yet mortality rate is high in rural areas. Changing life style, urbanization of rural area, prevalence of alcohol and drug intake etc. are some of the reasons for increasing the number of cancer patients in rural area.[13] Dietary patterns like imbalanced diet, red meat consumption, charcoal cooking, intake of ghee etc. along with lessphysical activities in rural area increase the risk of cancer among rural people.[11] Stomach cancer among men and cervical cancer among women are more likely to find in rural area due to infection. [5,14]

The primary level delay, secondary level delay and tertiary level delay in starting the treatment is observed in the various studies. Lack of awareness, inadequate health infrastructure, availability of quacks, CAM (Complementary Alternative Medicine), prevalence of alternate system, distance from rural area to tertiary care centre (TCC) in urban area and financial constraints play a critical role in the diagnosis and initiation of cancer treatment among rural people. [13,15]

More than 70% of cancer patients are diagnosed in advanced stage which affects the positive outcome of treatment on cancer patients. [16]Some curable cancers become incurable due to the unavailability of

appropriate health infrastructures and trained healthcare professionals for diagnosis and treatment in rural areas. [13] There are a need of adequate health care system in rural area, availability of trained healthcare professionals and strong political will to reduce the period of delay for initiating cancer treatment among rural people. [15, 16] Cancer incidence, morbidity and mortality can be reduced through timely screening, diagnosis, treatment and palliative care. [17]

**Review Method:** The study is based on secondary data related with delay in cancer diagnosis, its factors and consequences. Researchers searched Google, predominately Google Scholar, Pub Med, Research Gate, Wiley Online Library and Elsevier with key words related to topic like Cancer, health care, delay, rural, burden, recommendation and statistics were used to review literature on the level of delay, magnitude of cancer and solution to reduce the period of delay. The related studies from the period of year 2000 onward were retrieved. Retrieved studies, which were relevant for research objectives and written in the English language.

**Aim of study:** The aim of study was to review factors influencing and consequences related to delay in the initiation for the treatment of cancer among rural dwellers of India.

**Findings and discussions of the study:** The findings encompassed four sections such are as follows: A) The first section deals with the meaning of primary, secondary and tertiary delay among rural cancer patients. B) In the second section, factors are discussed that are responsible for delays in the treatment of cancer patients in the rural areas. C) The third section deals with the consequences of delay in the initiation of treatment for cancer. D) The fourth section recommended the measurements to reduce the period of delay and improve the outcome of cancer treatment.

**A) Level of delay in initiation of cancer treatment:** The delay in initiation of cancer treatment is observed at various levels i.e. Primary Level, Secondary Level and Tertiary Level. The primary delay may be defined as the delay between onset of symptom observed by patient and the first consultation to the medical practitioner. The secondary delay is defined as the delay between first consultation to the medical practitioner and place where the cancer is initially diagnosed. The third level of delay is tertiary level delay which is defined as the delay between place of cancer initially diagnosed and the first initiation in cancer treatment or the treatment gets started. [18]

The delay has been further divided into two categories, such as Patient Delay and Health Care System Delay. Patient level delay may define as the time gap > 3 months between first symptom observed and first consultation to the medical professional. The socio-economic and socio- cultural factor plays the

major role in delay at the patient's level and there are also, symptomatology experience, ethnic origin, beliefs or perceptions that affect the attitude of patients represent important causal factors of patient level delay.19 Social demographic variables of patient, such as age, gender, caste, class, place of residence etc. influence the patient level delay in the treatment of cancer. Along with social demographic factors, lack of awareness, ignorance, lack of time, family related problems, unavailability of anyone to take for treatment and fear from cancer disease are patient's factors which are responsible for primary delay and sometime secondary delay. [18]

The health care system delay may be refers to access limitations like, lack of good health care centres in locality, no availability of specialized or tertiary health care facilities and lack of adequate screening facilities; inherent problems of an established health care system, like disease management, problems in obtaining or scheduling diagnostic investigations; and communication gap between patients and physicians.[19] In the study of Dwivedi et al. (2012), 67.7% newly registered cancer patients came from urban areas. About 73.5% of cancer patients came to tertiary healthcare in advance stage. Factors related with healthcare system, like mis-diagnostic, improper diagnostic and symptomatic treatment were influencing the secondary level of delay. Some factors in the field of health, such as, inadequate treatment facilities, lack of referral network etc, play a critical role in the tertiary level of delay.[18]

**B) Factor influencing delay in initiation of cancer treatment**: There are the various factors influencing the delay in starting the treatment, such are as social-cultural elements, lack of education, lack of financial support, lack of awareness about cancer symptoms, etc are responsible.[20] It is observed that doctors and other healthcare professionals are more likelypreferred to work in urban areas. There are some prominent characteristics of rural areas, such as poor fiscal governance, inadequate health infrastructure, shortage of trained facilities, caste and class based inequalities, uneven regional development and non-accessibility to health care service that are playing a critical role in early diagnosis and initiation of cancer treatment. [21]

The cancer patients diagnosed with advanced stage are more likely to have poor outcome during treatment. In the context of poor health care facilities in rural area, cancer patients have to migrate into cities or urban areas for cancer related treatment where tertiary health care facilities are available. They confront different issues other than treatment such as making arrangement for stay and food, travelling cost, loss in job or business of cancer patient as well as accompanying attendent.[13] The accessibility and affordability in the context of healthcare are poor in rural area as the cancer treatment is very expensive and out of pocket for affected individual and their families.[22,23]

The total annual economic cost spends on cancer treatment in 2010 was estimated at approximately US$ 1.16 trillion.[3, 24] It is evident that around 18 % of cancer survival has delayed their treatment after 'being diagnosed' due to 'financial barriers'. It was estimated that average costs spend on cancer treatment in 2015 had increased between Rs. 4 Lakhs to Rs. 6 Lakhs (on lung cancer up to Rs. 4.6 Lakhs, oral cancer Rs. 4.3 Lakhs, breast cancer Rs. 6 Lakhs and cervical cancer Rs. 5 Lakhs). [25] It was also reported that the average cost rose from the year 2000 to 2015 said by Naresh Parmar, CEO, Karnataka region, Apollo Hospitals. The treatment cost also increased 'due to expensive infrastructure, new technology-based investigation costs and newer drugs'.[26] Health insurance coverage is not functioning in a good manner. Among insured people, only one fifth is able to receive full amount from health insurance.[22,23]

There is a lack of awareness among rural people about government scheme, such as Ayushman Bharat Scheme, Central Government Health Scheme (CGHS), Prime Minister's National Relief Fund (PMNRF), National Cancer Relief Fund and other related schemes. [22, 23] Hence, they have to depend on 'distress money', such as borrowing money on heavy interest, selling and mortgage assets (living and non-living), and contribution from friends and relatives to finance cancer treatment and healthcare payment. [27] Migration for cancer related treatment to urban areas puts the financial burden among rural cancer survivors, increases the burden of tertiary care centres and limits the use of healthcare infrastructure, which further delays in the investigations and treatment. Sometime financial constraints lead to non-compliance of cancer treatment among rural patients.[13]

**C) Consequences of delay in cancer treatment initiation:** Delaying in initiating the cancer treatment and not adhering the prescribe therapies will cause poor outcome that will further leads to poor quality of life, physical pain and inactivity, disability, change in BMI, psychological pain or trauma and deaths.28 Rural regions have fewer health care facilities related with cancer treatment along with extreme poverty and poor literacy rate among rural people.[12] It is significant that the cancer patients with poor outcome are more likely to discourage other rural people to take the treatment of cancer. This will also ‘lead to vicious cycle’ of poor outcome in the context of cancer treatment and changing post treatment lifestyle. [13]

In 2015, a study was conducted in India, it was observed that the survival rate of patients diagnosed with cervix cancer was very low, nearly about 50 % of studied female was died in first two years and around 30% were alive after 5 years of survival. It was observed that the lack of health care facilities, supportive technologies, trained professionals, financial resources and other social or family support acted as factors behind the poor survival rate among cervical cancer patients in low-resource settings.[29]

In the study of Tiara Cristina et al. (2017), low education level among 64.9% breast cancer women influenced the delay in treatment. The delay in diagnosis and treatment directly affected the health of cancer survivals. There was a need of early detection, identification of risk factor and timely treatments. The sample consisted of 82 women who diagnosed with breast cancer in Parana, Southern Brazil. The average time for diagnosis was 102.5 ± 165.5 days. The treatment was delayed for 63.4% of the participants. The average time of delay in treatment was 87.3 ± 65.5 days. Low education level among 64.9% breast cancer women influenced the delay in treatment. The delay in diagnosis and treatment directly affected the health of cancer survivals. There was a requirement of early detection, identification of risk factor and timely treatments.[30]

In 2018, there were more than 18 million new cancer cases diagnosed out of which nearly 5 million cases of breast, cervical, colorectal, and oral cancers that could have been detected sooner and treated more effectively. Early detection, screening, and diagnosis have been proven to significant improvement in patient survival rates and quality of life, as well as the effective reduction in the cost and complexity of cancer treatment. However, barriers to achieving higher rates of early cancer detection need to be addressed at the individual, health system, and governmental level to significantly reduce the personal and financial burden of cancer worldwide.[31] The delay in diagnosis and treatment will play a vital role in poor survival of cancer patients in India. [6]

**D) Recommendations for reducing the period of delay:** Early screening and diagnosis, trained health care professionals, follow-up practices during treatment and post-treatment, well tracked referral pathways, community level awareness, availability of health care management and palliative care can prevent the poor outcome of cancer treatment effectively. [1,6,11,13,15] Early detection of disease, tobacco and alcohol control during and after treatment, health education and cost effective procedure like visual inspection, physical examination, necessary and cheap investigations (blood investigations, histopathology, cytology, mammography and X-ray imagining) should be recommended and adopted, which can be resulted highly reduction in the delay of initiating cancer treatment among rural population.[32]

Primary prevention or awareness programmes on cancer which may include cancer related symptoms, anti-tobacco and alcohol campaign, importance of healthy diet and physical activity, pre-diagnostic tests, government financial assistance schemes, and awareness related to stigma associated with cancer treatment and its impacts should be initiated at the grass root level. The Knowledge, Attitude and Practice (KAP) pattern, screening programme, change in tobacco use and referral system will reduce the delay in diagnosis and treatment. Lack of diagnostic facilities in rural areas is responsible for late

presentation of cases. Hence, there is a requirement of multi- disciplinary approach to provide treatment at each regional cancer centre in India. The distance has to cover by the patients for taking cancer related treatment, is need to be identified which may resulted to form the policies that further helps in the reduction of unnecessary cost and time consumed. [6] It is suggested to make cancer treatment accessible and affordable to all irrespective of any gender, age, class, caste and so on, so that cancer treatment can be started as early as possible.[33] The timely treatment initiated could improve the survival rate and also decrease the chance of spread cancer among people. The physicians recommended the early diagnosis and treatment initiation can increase the chances of survival.[34] It is highly misinterpreted that the cancer is a communicable disease in rural areas. It is required to educate the dweller of rural areas about the development of cancer, symptoms, types, diagnosis, treatment, which might reduce the stigma associated with the spread of cancer and its treatment. Beside educating the healthcare professionals of rural areas, it is also important to educate the general public in getting diagnosis and treatment of cancer.[15] It is also recommended that the effective network of cancer registries should be establish for obtaining required data on trend and magnitude of cancer in India at every level, whether it is rural or urban. [6]

## CONCLUSION:

There are three levels of delay, primary, secondary and tertiary level delay. The delay in diagnosis and initiating the treatment has different results, e.g. Stage I & II patients become Stage III & IV patients after delay. In the advance stage it is very difficult to provide curable treatment, only palliative treatment can be provided.

It is concluded that if time gap between first symptom developed and treatment initiated is reduced the result would be better. There are many problems like, awareness of symptoms, initial screening, timely referrals, travelling etc. are the main reasons behind delay.

To eliminate delay, the community level work must be initiated e.g. to educate the rural dwellers about symptoms of cancer, treatment for cancer, financial assistance schemes, as well as the stigma associated for better results. Cancer can be cure if it's screened out at initial stage.

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