

UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002.

Annual Report of the work done on the Minor Research Project

1. **Project Report No.** : 1st
2. **UGC Reference No.** : No. F.47-939/14 (General/78/WRO) XII
Plan dated 20th February 2015 and 22th
March 2017
3. **Period of report** : From 01/04/2017 to 31/03/2018
4. **Title of research project** : “Study Of Chronic Obstructive Pulmonary
Disease In Women Exposed To Biomass
Fuel Smoke In Sangli District Maharashtra”
5. **(a) Name of the Principal Investigator** : Dr. Prabha Mohan Patil
(b) Dept. and University/College where work has progressed : Department of Zoology,
Dr. Patangrao Kadam Mahavidyalaya,
Sangli.
6. **Effective date of starting of the project** : 01/04/2017
7. **Grant approved and expenditure incurred during the period of the report**
 - (a) **Total amount approved Rs.** : 3,70,000/-
 - (b) **Total amount received Rs.** : 3,45,000/-
 - (b) **Total expenditure Rs.** : 3,00,000/-
 - (c) **Report of the work done** :

Details of Work Done:

i. Brief objective of the project:

1. Survey of women using chulla from four different villages.
2. To estimate forced expiratory volume per one second in percentage, (FEV1%), Forced Vital Capacity in percentage (FVC%) and Ratio of forced expiratory volume per one second and Forced Vital Capacity in Percentage (FEV1/FVC%).
3. To find out body mass index (BMI) in women exposed to biomass fuel smoke for cooking.
4. To study hematological parameters – Total WBC count, Total RBC count, Platelet count, differential count of WBC, Haemoglobin (Hb%), Erythrocyte sedimentation Rate and clotting time.

ii. Work done so far and results achieved and publications, if any, resulting from the work:

The proposed project work has been planned to complete within a period of 2.0 years.

The work done so far is as follows

1. Survey of women using chulla and LPG from four different namely Karnal, Bisur, Rasulwadi, Vajegaon.
2. Total 600 women using chulla and Total 600 women using LPG for this study.
3. Information was collected regarding Age, Height, weight, type of house, type of kitchen, type of fuel, No. of hours exposure to fuel and No. of years expose to fuel according to proforma.
4. Out of 600 women using chulla and LPG 300 women underwent spirometry. In 300 women using chull and LPG body mass index was calculated.
5. In 300 women using chull and LPG blood samples were collected to study the blood parameters.

Details of Publication:

Paper published in Journals: Researches In Biosciences, Agricultural and Technology

Publisher: Vishwashanti Multipurpose Society (Global Peace Multipurpose Society)
R.No.MH-659/13(N)

ISBN: Special Issue (1), Vol-V, April 2017 ISSN No. 2347-517X (Online), 2017

Title: Indoor air pollution and respiratory dysfunction in women exposed to biomass fuel smoke in rural area of Sangli District.

Author: P.M.Patil*, R.G.Patil, P.R. Kumbhar

Page No. : 54-56

- iii. **Has the progress been according to original plan of work and towards achieving the objective:** The Progress has been according to the original plan.
- iv. **Please indicate the difficulties, if any, experienced in implementing the project:** No particular difficulty occurred while implementing the project.
- v. **If project has not been completed, please indicate the approximate time by which it is likely to be completed:** Till One year is remained.
- vi. **If the project has been completed, please enclose a summary of the findings of the study. Two bound copies of the final report of work done may also be sent to the Commission:** Till One year is remained.
- vii. **Any other information which would help in evaluation of work done on the project. At the completion of the project, the first report should indicate the output, such as (a) Manpower trained (b) Ph. D. awarded (c) Publication of results (d) other impact, if any:** Nil

(Dr. Prabha M. Patil)

PRINCIPAL INVESTIGATOR

(Dr.D. G. Kanase)

UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002.

Annual Report of the work done on the Minor Research Project

1. **Project Report No.** : 2nd
2. **UGC Reference No.** : No. F.47-939/14 (General/78/WRO) XII
Plan dated 20th February 2015 and 22th
March 2017
3. **Period of report** : From 01/04/2018 to 31/03/2019
4. **Title of research project** : “Study Of Chronic Obstructive Pulmonary
Disease In Women Exposed To Biomass
Fuel Smoke In Sangli District Maharashtra”
5. **(a) Name of the Principal Investigator** : Dr. Prabha Mohan Patil
(b) Dept. and University/College where work has progressed : Department of Zoology,
Dr. Patangrao Kadam Mahavidyalaya,
Sangli.
6. **Effective date of starting of the project** : 01/04/2017
7. **Grant approved and expenditure incurred during the period of the report**
 - (a) **Total amount approved Rs.** : 3,70,000/-
 - (b) **Total amount received Rs.** : 3,45,000/-
 - (b) **Total expenditure Rs.** : 3,59,511/-
 - (c) **Report of the work done** :

Details of Work Done:

i. Brief objective of the project:

1. Survey of women using chulla from four different villages.
2. To estimate forced expiratory volume per one second in percentage, (FEV1%), Forced Vital Capacity in percentage (FVC%) and Ratio of forced expiratory volume per one second and Forced Vital Capacity in Percentage (FEV1/FVC%).
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4. To study hematological parameters – Total WBC count, Total RBC count, Platelet count, differential count of WBC, Haemoglobin (Hb%), Erythrocyte sedimentation Rate and clotting time.

ii. Work done so far and results achieved and publications, if any, resulting from the work:

The proposed project work has been planned to complete within a period of 2.0 years.

The work done so far is as follows

1. Out of 600 women using chulla and LPG Remaining 300 women using chulla and LPG from four different villages underwent spirometry and in these women body mass index was calculated.
2. Remaining 300 women using chull and LPG from four different villages blood samples were collected to study the blood parameters.

Details of Publication:

1) Paper published in Journals: International Journal of Research and Analytical Reviews

Publisher: Balwant College, Vita

ISBN: UGC Approved: 43602 e ISSN 2348 –1269, Print ISSN 2349-5138

Title: Impairment of pulmonary function in women exposed to Biomass fuel smoke in rural area of sangli district (Maharashtra)

Author: Dr.Mrs.P.M. Patil*, Dr.R.G.Patil

Page No. : 557-561

2) **Paper published in Journals:** International Journal of Innovative Knowledge Concepts

Publisher: Sonhira Publication

ISBN: Volume VII, ISSN: 2454-2415, Issue 4, April 2019

Title: Chronic Obstructive Pulmonary Diseases and Body Mass Index Relation in Women from Rural Area Mouje Khotwadi of Sangli District.

Author: P.M. Patil

Page No. : 225-233

3) **Paper published in Journals:** International Journal of Multifaceted & Multilingual Studies A Peer Reviewed Journal

Publisher: Dr Patangrao Kadam Mahavidyalaya, Sangli.

ISBN: Volume – VI, ISSN-2350-0476, Issue – III March 2019, Impact Factor 4.205

Title: Indoor Air Pollution and Risk of COPD in Rural Women Exposed to Biomass Fuel Smoke.

Author: Dr.Mrs.P.M. Patil*, Dr.D.G. Kanase

Page No. : 280-290

iii. **Has the progress been according to original plan of work and towards achieving the objective:** The Progress has been according to the original plan.

iv. **Please indicate the difficulties, if any, experienced in implementing the project:** No particular difficulty occurred while implementing the project.

v. **If project has not been completed, please indicate the approximate time by which it is likely to be completed:** Completed

vi. **If the project has been completed, please enclose a summary of the findings of the study. Two bound copies of the final report of work done may also be sent to the Commission:** Attached.

vii. **Any other information which would help in evaluation of work done on the project. At the completion of the project, the first report should indicate the output, such as (a) Manpower trained (b) Ph. D. awarded (c) Publication of results (d) other impact, if any: Nil**

(Dr. Prabha M. Patil)

PRINCIPAL INVESTIGATOR

(Dr.D. G. Kanase)

UNIVERSITY GRANTS COMMISSION

BAHADUR SHAH ZAFAR MARG

NEW DELHI – 110 002.

PROJECT REPORT

1. Title of research project : “Study Of Chronic Obstructive Pulmonary Disease In Women Exposed To Biomass Fuel Smoke In Sangli District Maharashtra”
2. Name and address of the Principal Investigator : Dr. Prabha Mohan Patil
Department of Zoology, Dr. Patangrao Kadam Mahavidyalaya, Sangli.
3. Name and address of the Institution : Department of Zoology, Dr. Patangrao Kadam Mahavidyalaya, Sangli. Maharashtra. 416416
4. UGC approval letter no. and date : No. F.47-939/14 (General/78/WRO) XII Plan dated 20th February 2015 and 22th March 2017
5. Date of implementation : 01/04/2017
6. Tenure of the project : **From 01/04/2017 to 31/03/2019**
7. Total grant allocated : 3,70,000/-
8. Total grant received : 3,45,000/-
9. Final expenditure : 3,59,511/-
10. Title of the project : “Study Of Chronic Obstructive Pulmonary Disease In Women Exposed To Biomass Fuel Smoke In Sangli District Maharashtra”

11. Objectives of the project:

1. Survey of women using chulla from four different villages.
2. To estimate forced expiratory volume per one second in percentage, (FEV1%), Forced Vital Capacity in percentage (FVC%) and Ratio of forced expiratory volume per one second and Forced Vital Capacity in Percentage (FEV1/FVC%).
3. To find out body mass index (BMI) in women exposed to biomass fuel smoke for cooking.
4. To study hematological parameters – Total WBC count, Total RBC count,

Platelet count, differential count of WBC, Haemoglobin (Hb%), Erythrocyte sedimentation Rate and clotting time.

12. Workdone (First Year): The work done so far is as follows:

The proposed project work has been planned to complete within a period of 2.0 years. The work done so far is as follows

1. Survey of women using chulla and LPG from four different namely Karnal, Bisur, Rasulwadi, Vajegaon.
2. Total 600 women using chulla and Total 600 women using LPG for this study.
3. Information was collected regarding type of house, type of kitchen, type of fuel, No. of hours exposure to fuel and No. of years expose to fuel according to proforma.
4. Out of 600 women using chulla and LPG 300 women underwent spirometry. In 300 women using chull and LPG body mass index was calculated.
5. In 300 women using chull and LPG blood samples were collected to study the blood parameters.

Details of Publication:

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ISBN: Special Issue (1), Vol-V, April 2017 ISSN No. 2347-517X (Online), 2017

Title: Indoor air pollution and respiratory dysfunction in women exposed to biomass fuel smoke in rural area of Sangli District.

Author: P.M.Patil*, R.G.Patil, P.R. Kumbhar

Page No. : 54-56

Workdone (Second Year):

The proposed project work has been planned to complete within a period of 2.0 years. The work done so far is as follows

1. Out of 600 women using chulla and LPG Remaining 300 women using chulla and LPG from four different villages underwent spirometry and in these women body mass index was calculated.
2. Remaining 300 women using chull and LPG from four different villages blood samples were collected to study the blood parameters.

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Author: P.M. Patil

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3) Paper published in Journals: International Journal of Multifaceted & Multilingual Studies A Peer Reviewed Journal

Publisher: Dr Patangrao Kadam Mahavidyalya, Sangli.

ISBN: Volume – VI, ISSN-2350-0476, Issue – III March 2019, Impact Factor 4.205

Title: Indoor Air Pollution and Risk of COPD in Rural Women Exposed to Biomass Fuel Smoke.

Author: Dr.Mrs.P.M. Patil*, Dr.D.G. Kanase

Page No. : 280-290

- 12.** Whether objectives were achieved : **Yes**
- Spirometry was successfully done and body mass index was calculated, hematological parameters were observed and total data was analyzed using Z calculated test. For spirometric parameter odds ratio was calculated.

13. Achievements from the project :

- Prolonged exposure to biomass fuel smoke in poorly ventilated kitchen causes reduced lung functions and women suffered from Chronic Obstructive Pulmonary Diseases (COPD).
- In subject group the type of COPD observed was obstructive and restrictive type.
- As age and years of exposure increases COPD increases.
- In the present study, out of 600 subject women, 197 women had obstructive type (OD) and 194 women had restrictive type (RD) of COPD.
- In obstructive and restrictive type of COPD regarding BMI, there is an inverse relationship between BMI and COPD.
- Wood smoke exposure had harmful effects on blood parameters of women who were exposed to biomass fuel smoke.

14 Summary of the findings:

To Study the Chronic Obstructive Pulmonary Disease in women exposed to biomass fuel smoke in Sangli district Maharashtra. We selected four different villages from Sangli district. These villages are 6 to 7 km away from Sangli city, free of air pollution. These villages are namely Karnal, Bisur, Rasulwadi, Vajegaon. Survey of women using chulla and LPG was done in these villages. From these villages 600 women using chulla (subject) and 600 women using LPG (control)

were selected. Information regarding Age, Height, weight, type of house, type of kitchen, type of fuel, No. of hours exposure to fuel and No. of years expose to fuel according to proforma was collected. All these subject and control women underwent spirometry and spirometric parameters FEV₁%, FVC% and FEV₁/FEV% were observed. In all these women body mass index was calculated. In subject and control group blood samples were collected to study hematological parameters.

In this study Subject women showed respiratory symptoms like cough, expectoration, breathlessness, wheezing and chest pain which further affects respiratory function.

The values of parameters of spirometry FEV₁%, FVC% and FEV₁/FVC% were found significantly reduced in the rural women exposed to the biomass fuel smoke. The reduction in FEV₁% indicates obstructive type of spirometry and reduction in FVC% indicates restrictive type of spirometry. In this study out of 600 subject women, 197 women had obstructive type of spirometry (FEV₁%<80%) and 194 women had restrictive type of spirometry (FVC%<80%). In 197 (OD) women and 194 (RD) women different stages of COPD were observed. We found that from 197 (OD) women, 134 women had mild obstructive, 19 women had moderate obstructive and 44 women had severe obstructive. From 194 (RD) women, 150 (RD) women had mild obstruction, 44(RD) women had moderate obstruction and 0 RD women had severe obstruction. In 197 women who had obstructive type of spirometry were having difficulty in expiration and in 194 women who had obstructive type of disorder, were having difficulty in inspiration.

In this study odds ratio was calculated and found that odds ratio for COPD is 11.49 [95% CI (8.63; 15.28), P < 0.0001]. It indicates that prevalence of Chronic Obstructive Pulmonary Diseases (COPD) is higher in these four villages of Sangli District.

In the present investigation in the women who were exposed to biomass fuel smoke (n=600), it was found that the proportion of underweight and normal weight BMI category was higher in subject while in control group (n=600) proportion of overweight and obese BMI category was higher. Results of present investigation

showed that exposure period to biomass fuel smoke and decline in FEV₁%, FVC% were the main factors influencing BMI among COPD women.

In this study the blood parameter of subject group and control group were compared, it was found that the blood parameters, TRBC count, TWBC count, Platelet count were increased in subject group than control group. While there is no significant difference in HB%, ESR count and Clotting time between subject group and control group. In the present investigation the differential count of subject group and control group were compared, it was found that neutrophil, eosinophil, leukocyte count and monocyte were increased in subject group than control group. (In this study there was increase in monocyte count only in few women of four villages namely Karnal, Bisur, Rasulwadi and Vajegaon.) There is no significant difference in basophil count between subject group and control group.

Concluding Remarks Prolonged exposure to biomass fuel smoke in poorly ventilated kitchen causes reduced lung functions and women suffered from Chronic Obstructive Pulmonary Diseases (COPD). In subject group the type of COPD observed was obstructive and restrictive type. As age and years of exposure increases COPD increases. In the present study, out of 600 subject women, 197 women had obstructive type (OD) and 194 women had restrictive type (RD) of COPD. In four different villages, regarding obstructive type of COPD in Karnal and Vajegaon the no. of women who had obstructive disorder is large. In four different villages, regarding restrictive type of COPD in Bisur and Vajegaon the no. of women who had restrictive disorder is large. In obstructive and restrictive type of COPD regarding BMI, there is an inverse relationship between BMI and COPD. Wood smoke exposure had harmful effects on blood parameters of women who were exposed to biomass fuel smoke. Thus chronic exposure to biomass fuel smoke causes adverse effect on lung function, Body Mass Index and on haematological parameter.

Based on the observations of present investigation it is recommended that the women who were exposed to biomass fuel smoke should be protected from smoke by improving ventilation. The ventilation in the kitchen should be rich and proper. Women should use mask to avoid inhalation of smoke.

Women should use improved stove, smokeless chulla which will reduce the

indoor pollution.

Women should use bio-gas. Women should use LPG and electricity stoves in the kitchen.

This will reduce indoor air pollution, this will also save the time of housewives.

Government should provide free LPG facility or LPG in low cost to economically poor families. The environmental protection agencies should plan “Learning programme for the rural families using biomass fuel for cooking through which women will become aware about her health.

Use of improved smokeless chulla, reduces air pollution. It is necessary for the maintenance of respiratory health status of women in rural area. Efforts have been made to bring out the facts about health status of women and recommendations have been made to protect and improve health status of women from rural area.

15 Contribution to the society

From the present investigation it was suggested that women from rural society should use smokeless chulla, improved stove which will reduce the indoor pollution.

Women from rural society should use bio-gas, LPG and electricity stoves in the kitchen.

16 Whether any Ph.D. : **No**
enrolled/produced out of the
project?

17 No. Of publications out of : **04**
the project **Attached with this report.**

(Dr. Prabha M. Patil)

PRINCIPAL INVESTIGATOR

(Dr.D. G. Kanase)

UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002.

Final report of the work done on the Minor Research Project

1. Title of research project : “Study Of Chronic Obstructive Pulmonary Disease In Women Exposed To Biomass Fuel Smoke In Sangli District Maharashtra”
2. Name and address of the Principal Investigator : Dr. Prabha Mohan Patil
Department of Zoology, Dr. Patangrao Kadam Mahavidyalaya, Sangli.
3. Name and address of the Institution : Department of Zoology, Dr. Patangrao Kadam Mahavidyalaya, Sangli. Maharashtra.
416416
4. UGC approval letter no. and date : No. F.47-939/14 (General/78/WRO) XII Plan dated 20th February 2015 and 22th March 2017
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6. Tenure of the project : **From** 01/04/2017 **to** 31/03/2019
7. Total grant allocated : 3,70,000/-
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10. Title of the project : “Study Of Chronic Obstructive Pulmonary Disease In Women Exposed To Biomass Fuel Smoke In Sangli District Maharashtra”
11. Objectives of the project :
 1. Survey of women using chulla from four different villages.
 2. To estimate forced expiratory volume per one second in percentage, (FEV1%), Forced Vital Capacity in percentage (FVC%) and Ratio of forced expiratory

volume per one second and Forced Vital Capacity in Percentage (FEV1/FVC%).

3. To find out body mass index (BMI) in women exposed to biomass fuel smoke for cooking.
4. To study hematological parameters – Total WBC count, Total RBC count, Platelet count, differential count of WBC, Haemoglobin (Hb%), Erythrocyte sedimentation Rate and clotting time.

12. Whether objectives were achieved : **Yes**
Spirometry was successfully done and body mass index was calculated, hematological parameters were observed and total data was analyzed using Z calculated test. For spirometric parameter odds ratio was calculated.

13. Achievements from the project : The synthesized catalysts were successfully utilized for carrying out multicomponent reactions. The work has been published in conference proceeding book.

13. Achievements from the project :

- Prolonged exposure to biomass fuel smoke in poorly ventilated kitchen causes reduced lung functions and women suffered from Chronic Obstructive Pulmonary Diseases (COPD).
- In subject group the type of COPD observed was obstructive and restrictive type.
- As age and years of exposure increases COPD increases.
- In the present study, out of 600 subject women, 197 women had obstructive type (OD) and 194 women had restrictive type (RD) of COPD.
- In obstructive and restrictive type of COPD regarding BMI, there is an inverse relationship between BMI and COPD.

- Wood smoke exposure had harmful effects on blood parameters of women who were exposed to biomass fuel smoke.

14 Summary of the findings:

To Study the Chronic Obstructive Pulmonary Disease in women exposed to biomass fuel smoke in Sangli district Maharashtra. We selected four different villages from Sangli district. These villages are 6 to 7 km away from Sangli city, free of air pollution. These villages are namely Karnal, Bisur, Rasulwadi, Vajegaon. Survey of women using chulla and LPG was done in these villages. From these villages 600 women using chulla (subject) and 600 women using LPG (control) were selected. Information regarding Age, Height, weight, type of house, type of kitchen, type of fuel, No. of hours exposure to fuel and No. of years expose to fuel according to proforma was collected. All these subject and control women underwent spirometry and spirometric parameters FEV₁%, FVC% and FEV₁/FEV% were observed. In all these women body mass index was calculated. In subject and control group blood samples were collected to study hematological parameters.

In this study Subject women showed respiratory symptoms like cough, expectoration, breathlessness, wheezing and chest pain which further affects respiratory function.

The values of parameters of spirometry FEV₁%, FVC% and FEV₁/FVC% were found significantly reduced in the rural women exposed to the biomass fuel smoke. The reduction in FEV₁% indicates obstructive type of spirometry and reduction in FVC% indicates restrictive type of spirometry. In this study out of 600 subject women, 197 women had obstructive type of spirometry (FEV₁% < 80%) and 194 women had restrictive type of spirometry (FVC% < 80%). In 197 (OD) women and 194 (RD) women different stages of COPD were observed. We found that from 197 (OD) women, 134 women had mild obstructive, 19 women had moderate obstructive and 44 women had severe obstructive. From 194 (RD) women, 150 (RD) women had mild obstruction, 44 (RD) women had moderate obstruction and 0 RD women had severe obstruction. In 197 women who had obstructive type of spirometry were having difficulty in expiration and in 194 women who had obstructive type of disorder, were

having difficulty in inspiration.

In this study odds ratio was calculated and found that odds ratio for COPD is 11.49 [95% CI (8.63; 15.28), $P < 0.0001$]. It indicates that prevalence of Chronic Obstructive Pulmonary Diseases (COPD) is higher in these four villages of Sangli District.

In the present investigation in the women who were exposed to biomass fuel smoke (n=600), it was found that the proportion of underweight and normal weight BMI category was higher in subject while in control group (n=600) proportion of overweight and obese BMI category was higher. Results of present investigation showed that exposure period to biomass fuel smoke and decline in FEV₁%, FVC% were the main factors influencing BMI among COPD women.

In this study the blood parameter of subject group and control group were compared, it was found that the blood parameters, TRBC count, TWBC count, Platelet count were increased in subject group than control group. While there is no significant difference in HB%, ESR count and Clotting time between subject group and control group. In the present investigation the differential count of subject group and control group were compared, it was found that neutrophil, eosinophil, leukocyte count and monocyte were increased in subject group than control group. (In this study there was increase in monocyte count only in few women of four villages namely Karnal, Bisur, Rasulwadi and Vajegaon.) There is no significant difference in basophil count between subject group and control group.

Concluding Remarks Prolonged exposure to biomass fuel smoke in poorly ventilated kitchen causes reduced lung functions and women suffered from Chronic Obstructive Pulmonary Diseases (COPD). In subject group the type of COPD observed was obstructive and restrictive type. As age and years of exposure increases COPD increases. In the present study, out of 600 subject women, 197 women had obstructive type (OD) and 194 women had restrictive type (RD) of COPD. In four different villages, regarding obstructive type of COPD in Karnal and Vajegaon the no. of women who had obstructive disorder is large. In four different villages, regarding restrictive type of COPD in Bisur and Vajegaon the no. of women who had restrictive disorder is large. In obstructive and restrictive type of COPD regarding BMI, there is an inverse

relationship between BMI and COPD. Wood smoke exposure had harmful effects on blood parameters of women who were exposed to biomass fuel smoke. Thus chronic exposure to biomass fuel smoke causes adverse effect on lung function, Body Mass Index and on haematological parameter.

Based on the observations of present investigation it is recommended that the women who were exposed to biomass fuel smoke should be protected from smoke by improving ventilation. The ventilation in the kitchen should be rich and proper. Women should use mask to avoid inhalation of smoke.

Women should use improved stove, smokeless chulla which will reduce the indoor pollution.

Women should use bio-gas. Women should use LPG and electricity stoves in the kitchen.

This will reduce indoor air pollution, this will also save the time of housewives.

Government should provide free LPG facility or LPG in low cost to economically poor families. The environmental protection agencies should plan "Learning programme for the rural families using biomass fuel for cooking through which women will become aware about her health.

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From the present investigation it was suggested that women from rural society should use smokeless chulla, improved stove which will reduce the indoor pollution.

Women from rural society should use bio-gas, LPG and electricity stoves in the kitchen.

16 Whether any Ph.D. : No

enrolled/produced out of the project?

17 No. Of publications out of : **04**
the project **Attached with this report.**

(Dr. Prabha M. Patil)

PRINCIPAL INVESTIGATOR

(Dr.D. G. Kanase)

Summary

Summary

Title of Minor Project: “Study Of Chronic Obstructive Pulmonary Disease In Women Exposed To Biomass Fuel Smoke In Sangli District Maharashtra”

UGC File NO: No. F.47-939/14 (General/78/WRO) XII Plan dated 22th March 2017

To Study the Chronic Obstructive Pulmonary Disease in women exposed to biomass fuel smoke in Sangli district Maharashtra. We selected four different villages from Sangli district. These villages are 6 to 7 km away from Sangli city, free of air pollution. These villages are namely Karnal, Bisur, Rasulwadi, Vajegaon. Survey of women using chulla and LPG was done in these villages. From these villages 600 women using chulla (subject) and 600 women using LPG (control) were selected. Information regarding Age, Height, weight, type of house, type of kitchen, type of fuel, No. of hours exposure to fuel and No. of years expose to fuel according to proforma was collected. All these subject and control women underwent spirometry and spirometric parameters $FEV_1\%$, $FVC\%$ and $FEV_1/FVC\%$ were observed. In all these women body mass index was calculated. In subject and control group blood samples were collected to study hematological parameters.

In this study Subject women showed respiratory symptoms like cough, expectoration, breathlessness, wheezing and chest pain which further affects respiratory function.

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mild obstruction, 44(RD) women had moderate obstruction and 0 RD women had severe obstruction. In 197 women who had obstructive type of spirometry were having difficulty in expiration and in 194 women who had obstructive type of disorder, were having difficulty in inspiration.

In this study odds ratio was calculated and found that odds ratio for COPD is 11.49 [95% CI (8.63; 15.28), $P < 0.0001$]. It indicates that prevalence of Chronic Obstructive Pulmonary Diseases (COPD) is higher in these four villages of Sangli District.

In the present investigation in the women who were exposed to biomass fuel smoke (n=600), it was found that the proportion of underweight and normal weight BMI category was higher in subject while in control group (n=600) proportion of overweight and obese BMI category was higher. Results of present investigation showed that exposure period to biomass fuel smoke and decline in FEV₁%, FVC% were the main factors influencing BMI among COPD women.

In this study the blood parameter of subject group and control group were compared, it was found that the blood parameters, TRBC count, TWBC count, Platelet count were increased in subject group than control group. While there is no significant difference in HB%, ESR count and Clotting time between subject group and control group. In the present investigation the differential count of subject group and control group were compared, it was found that neutrophil, eosinophil, leukocyte count and monocyte were increased in subject group than control group. (In this study there was increase in monocyte count only in few women of four villages namely Karnal, Bisur, Rasulwadi and Vajegaon.) There is no significant difference in basophil count between subject group and control group.

Concluding Remarks Prolonged exposure to biomass fuel smoke in poorly ventilated kitchen causes reduced lung functions and women suffered from Chronic Obstructive Pulmonary Diseases (COPD). In subject group the type of COPD observed was obstructive and restrictive type. As age and years of exposure increases COPD increases. In the present study, out of 600 subject women, 197 women had

obstructive type (OD) and 194 women had restrictive type (RD) of COPD. In four different villages, regarding obstructive type of COPD in Karnal and Vajegaon the no. of women who had obstructive disorder is large. In four different villages, regarding restrictive type of COPD in Bisur and Vajegaon the no. of women who had restrictive disorder is large. In obstructive and restrictive type of COPD regarding BMI, there is an inverse relationship between BMI and COPD. Wood smoke exposure had harmful effects on blood parameters of women who were exposed to biomass fuel smoke. Thus chronic exposure to biomass fuel smoke causes adverse effect on lung function, Body Mass Index and on haematological parameter.

Based on the observations of present investigation it is recommended that the women who were exposed to biomass fuel smoke should be protected from smoke by improving ventilation. The ventilation in the kitchen should be rich and proper. Women should use mask to avoid inhalation of smoke.

Women should use improved stove, smokeless chulla which will reduce the indoor pollution.

Women should use bio-gas. Women should use LPG and electricity stoves in the kitchen.

This will reduce indoor air pollution, this will also save the time of housewives.

Government should provide free LPG facility or LPG in low cost to economically poor families. The environmental protection agencies should plan "Learning programme for the rural families using biomass fuel for cooking through which women will become aware about her health.

Use of improved smokeless chulla, reduces air pollution. It is necessary for the maintenance of respiratory health status of women in rural area. Efforts have been made to bring out the facts about health status of women and recommendations have been made to protect and improve health status of women from rural area.

Details of Publication:

1.	<p>Paper published in Journals: Researches In Biosciences, Agricultural and Technology</p> <p>Publisher: Vishwashanti Multipurpose Society (Global Peace Multipurpose Society) R.No.MH-659/13(N)</p> <p>ISBN: Special Issue (1), Vol-V, April 2017 ISSN No. 2347-517X (Online), 2017</p> <p>Title: Indoor air pollution and respiratory dysfunction in women exposed to biomass fuel smoke in rural area of Sangli District.</p> <p>Author: P.M.Patil*, R.G.Patil, P.R. Kumbhar</p> <p>Page No. : 54-56</p>
2	<p>Paper published in Journals: International Journal of Research and Analytical Reviews</p> <p>Publisher: Balwant College, Vita</p> <p>ISBN: UGC Approved: 43602 e ISSN 2348 –1269, Print ISSN 2349-5138</p> <p>Title: Impairment of pulmonary function in women exposed to Biomass fuel smoke in rural area of sangli district (Maharashtra)</p> <p>Author: Dr.Mrs.P.M. Patil*, Dr.R.G.Patil</p> <p>Page No. : 557-561</p>
3	<p>Paper published in Journals: International Journal of Innovative Knowledge Concepts</p> <p>Publisher: Sonhira Publication</p> <p>ISBN: Volume VII, ISSN: 2454-2415, Issue 4, April 2019</p> <p>Title: Chronic Obstructive Pulmonary Diseases and Body Mass Index Relation in Women from Rural Area Mouje Khotwadi of Sangli District.</p> <p>Author: P.M. Patil</p> <p>Page No. : 225-233</p>
4	<p>Paper published in Journals: International Journal of Multifaceted & Multilingual Studies A Peer Reviewed Journal</p> <p>Publisher: Dr Patangrao Kadam Mahavidyalaya, Sangli.</p> <p>ISBN: Volume – VI, ISSN-2350-0476, Issue – III March 2019, Impact Factor 4.205</p> <p>Title: Indoor Air Pollution and Risk of COPD in Rural Women Exposed to Biomass Fuel Smoke.</p> <p>Author: Dr.Mrs.P.M. Patil*, Dr.D.G. Kanase</p> <p>Page No. : 280-290</p>

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P. Investigator

Details of Publications

Title of Minor Project: “Study Of Chronic Obstructive Pulmonary Disease In Women Exposed To Biomass Fuel Smoke In Sangli District Maharashtra”

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- 1. Paper published in Journals:** Researches In Biosciences, Agricultural and Technology

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ISBN: Special Issue (1), Vol-V, April 2017 ISSN No. 2347-517X (Online), 2017

Title: Indoor air pollution and respiratory dysfunction in women exposed to biomass fuel smoke in rural area of Sangli District.

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- 2 Paper published in Journals:** International Journal of Research and Analytical Reviews

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Title: Impairment of pulmonary function in women exposed to Biomass fuel smoke in rural area of sangli district (Maharashtra)

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- 3 Paper published in Journals:** International Journal of Innovative Knowledge Concepts

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