A Prospective comparative study to evaluate the safety and efficacy of Different homeopathic Regimens for the treatment of smog induced health hazards including eye irritation and RTIs

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ABSTRACT

Background: Air pollution is a big environmental problem and it affects human health badly. Smog is a type of air pollution, which makes breathing difficult, causes upper, and lower respiratory tract infections. It also causes inflammation of lungs, which results in chest pain, flu, cold, cough, and irritation of eyes. Thus, this clinical trial was conducted to evaluate the safety and efficacy of different homeopathic regimens for the treatment of smog induced health hazards including eye irritation and RTIs.

Methodology: A Prospective comparative study was conducted to evaluate the safety and efficacy of Different homeopathic Regimens for the treatment of smog induced health hazards including eye irritation and respiratory tract infections. Safety and efficacy aspects of five therapeutic regimens were evaluated in this study. Patients were enrolled according to inclusion and exclusion criteria. Duration of study was 9 days. All five therapeutic regimens were code as G1, G2, G3, G4, and G5.

Results: Total 90 patients were enrolled in this study. Basic demographics of all patients were obtained at baseline. Gender, area of residence, basic education, household income, and marital status was recorded in data collection form. Complete blood count, liver function test, and renal function test were performed at baseline and on 9th day. Eye, nose and throat irritation, cough, sinusitis, sore throat, shortness of breath and wheezing were the monitoring parameters which were evaluated in every patients and their responses were recorded on data collection form. All therapeutic regimens showed excellent results but G2 therapeutic regimen have more promising results as compare to other regimens. Cross tab analysis was preformed to evaluate the relationship between efficacy of different treatment regimens and monitoring parameters i.e., sore throat, shortness of breath, cough, eye irritation, nose irritation, and sinusitis. Analysis of variance (ANNOVA) was performed by comparing means using SPSS. Tremendously, relationship between treatment regimens and CBC, RFT & LFT is insignificant, meaning none of the treatment arm affecting liver, kidneys, and blood production. Thus, all five therapeutic regimens are safe and effective for the treatment of smog induced health hazards.

Conclusion: All five therapeutic regimens are very effective in the treatment of eye, nose and throat irritation, sore throat, cough, sinusitis, shortness of breath, and wheezing. However, G2 (Rhenicine + eye bright lotion) have better effects to treat smog induced health problems.

INTRODUCTION

Air pollution is a big environmental problem and it also affects human health badly (1). In recent years, there has been increasing concerns about the health issues which are due to smog (2). Smog is a type of air pollution that occurs due to the chemical reaction of nitrogen oxides and volatile organic compounds in the presence of sunlight (3). Smoke and fog when combines it becomes smog. The word smog was first used in Landon in 1990 (4, 5). Smog is yellowish and blackish air, which makes breathing difficult, causes upper, and lower respiratory tract infections. It also causes inflammation of lungs, which results in chest pain,
flu, cold, cough, and irritation of eyes (5, 6).

Air pollution is the major problem in all big cities of Pakistan (7). Especially, Lahore is the second most polluted city (8). Increasing population and growing industrialization are the main reasons behind this situation (9, 10). That is why in Lahore every year a significant number of deaths occur due to air pollution (11). Air pollution defined by world health organization as the presence of elements, which are harmful to living organism above the specified range. These harmful elements are may be particulate matters, ozone, oxides of carbon, nitrogen oxide, aerosols etc (12). Smog not only affects physical health but also affects social and mental health (13).

Homeopathy is the mixture of two Greek words, homoio means similar, and pathos mean disease or suffering. This system of medicines was introduced by Samuel Hahnemann in 18th century (14, 15). As we all know, homeopathy has been found to be effective in the treatment of all diseases (16). That is why in this study, homeopathic medicines were used in patients who had health problem due to smog. As mentioned above, smog affects human health and cause breathing problems. Thus, this clinical trial was conducted to evaluate the safety and efficacy of different homeopathic regimens for the treatment of smog induced health hazards including eye irritation and respiratory tract infections (RTIs).

**METHODOLOGY**

**STUDY DESIGN**

A prospective comparative study was conducted in Pakistan homeopathic medical college hospital and research center, Lahore, Pakistan. For this purpose, ethical approval was obtained from the ethical review board before the initiation of the study. In this study, the safety and efficacy of different homeopathic regimens were analyzed for the treatment of smog induced health hazards including eye irritation and RTIs. Following five therapeutic regimens dispensed in patients with smog induced health hazards.

### Treatment Arms

<table>
<thead>
<tr>
<th>Treatment Arms</th>
<th>Ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inflam + eye bright lotion (G1)</strong></td>
<td><strong>Inflam</strong>: Apis Mel 4D, Baryta Mur 6D, Belladone 4D, BoswelliaSer 1D, Echinacea Ang 1D, Merc Corr 6D, Phytolacca Dec 3D, Salix Alb 1D, Zingiber 1D. <strong>Eye bright lotion</strong>: Euphrasia Officinalis Q 1.66% v/v, Borsaureq.s, Aqua destq.s, Incorporation factor q.s, Preservatives 0.002% w/v</td>
</tr>
<tr>
<td><strong>Rhenicine + eye bright lotion (G2)</strong></td>
<td><strong>Rhenicine</strong>: Arsenic Alb 6D, Echinacea Ang 1D, Euphrasia Off 1D, Kali Bich 6D, Hydrastis Can 1D, Merc Sol 6D, Pulsatilla-Nig 3D, SolidagoVir 1D, Zingiber 1D. <strong>Eye bright lotion</strong>: Euphrasia Officinalis Q 1.66% v/v, Borsaureq.s, Aqua destq.s, Incorporation factor q.s, Preservatives 0.002% w/v</td>
</tr>
<tr>
<td><strong>Inflam + Rhenicine + eye bright lotion (G3)</strong></td>
<td><strong>Inflam</strong>: Apis Mel 4D, Baryta Mur 6D, Belladone 4D, BoswelliaSer 1D, Echinacea Ang 1D, Merc Corr 6D, Phytolacca Dec 3D, Salix Alb 1D, Zingiber 1D. <strong>Rhenicine</strong>: Arsenic Alb 6D, Echinacea Ang 1D, Euphrasia Off 1D, Kali Bich 6D, Hydrastis Can 1D, Merc Sol 6D, Pulsatilla-Nig 3D, SolidagoVir 1D, Zingiber 1D. <strong>Eye bright lotion</strong>: Euphrasia Officinalis Q 1.66% v/v, Borsaureq.s, Aqua destq.s, Incorporation factor q.s, Preservatives 0.002% w/v</td>
</tr>
<tr>
<td><strong>Combination of 5 remedies + eye bright lotion (G4)</strong></td>
<td><strong>Combination of 5 remedies</strong>: Euphrasia Officinalis Q 1.66% v/v, Borsaureq.s, Aqua destq.s, Incorporation factor q.s, Preservatives 0.002% w/v</td>
</tr>
<tr>
<td><strong>Localen + eye bright lotion (G5)</strong></td>
<td><strong>Localen</strong>: HMT of Calendula Q 7.84 % v/v, Echinacea Q 3.92% v/v, Eucalyptus Q 0.2 % v/v, Mentholum 3DH 0.2 %w/v, Thymol 3DH 0.05 % w/v, Acid Benzoic 3DH 0.05 % w/v, Excipients Q.S to make 120 ml. <strong>Eye bright lotion</strong>: Euphrasia Officinalis Q 1.66% v/v, Borsaureq.s, Aqua destq.s, Incorporation factor q.s, Preservatives 0.002% w/v</td>
</tr>
</tbody>
</table>

Table 1: Therapeutic regimen

**INCLUSION CRITERIA**

Both male and female patients of age 7-85 years were enrolled in this study. Patients with irritation of eye, sore throat, and cough were included in this study. Subject willing to participate in the study and able to provide...
written informed consent were enrolled.

**EXCLUSION CRITERIA**

Pregnant and lactating mothers were not included in the study. Only those patients were included in the study who meets the inclusion criteria. Patients with chronic liver and kidney disease were excluded from the study. All those patients, who showed no interest in a future visit to the study site also not included.

**DATA COLLECTION**

This study was conducted from November 2019 to December 2019. Pre-assessment was made by homeopathic doctor according to predefined inclusion and exclusion criteria. After the primary assessment, final enrollment was made. Duration of study was nine days. At baseline, all monitoring parameters were assessed which includes, eye irritation, cough, sore throat, sinusitis etc. From safety, point of view, patients’ blood samples taken. Complete blood count, liver and renal functions tests were performed at baseline and on completion of study (9th day). Monitoring parameters and laboratory findings were recorded on the data collection form. A qualified pharmacist dispenses the medicine to all patients randomly. All patients were allocated to treatment arms randomly without any bias. A standard dose of all medicines was prescribed to every patient. Patients were advised to come for a check-up as per scheduled. Overview of the study is described in the figure below.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Total number of patients at baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total patients</td>
<td>90 (100%)</td>
</tr>
<tr>
<td>Males</td>
<td>36 (36.4%)</td>
</tr>
<tr>
<td>Females</td>
<td>63 (63.6%)</td>
</tr>
<tr>
<td>Marital status of patients</td>
<td></td>
</tr>
<tr>
<td>Unmarried</td>
<td>35 (38.9%)</td>
</tr>
<tr>
<td>Married</td>
<td>52 (57.8%)</td>
</tr>
<tr>
<td>Widow</td>
<td>2 (2.2%)</td>
</tr>
<tr>
<td>Divorced</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
</tr>
<tr>
<td>Un-employed</td>
<td>20 (22.2%)</td>
</tr>
<tr>
<td>Self-employed</td>
<td>25 (27.8%)</td>
</tr>
<tr>
<td>Salaried worker</td>
<td>45 (50%)</td>
</tr>
<tr>
<td>Household income (Rs -K)</td>
<td></td>
</tr>
<tr>
<td>≥ 100K</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>60-90K</td>
<td>4 (4.4%)</td>
</tr>
<tr>
<td>10-50K</td>
<td>70 (77.8%)</td>
</tr>
<tr>
<td>≤10K</td>
<td>16 (17.8%)</td>
</tr>
<tr>
<td>Years of schooling</td>
<td></td>
</tr>
<tr>
<td>≥12</td>
<td>22 (24.4%)</td>
</tr>
<tr>
<td>9-11</td>
<td>28 (31.1%)</td>
</tr>
<tr>
<td>5-8</td>
<td>21 (23.3%)</td>
</tr>
<tr>
<td>&lt;4</td>
<td>19 (21.1%)</td>
</tr>
</tbody>
</table>

Table 2: Basic Demographics

**RESULTS**

A total of 90 patients were enrolled in this study. Basic demographics of all patients were obtained at baseline. Gender, area of residence, basic education, household income, and marital status was recorded in the data collection form. Total 36.4% males and 63.6% females
Total 63.3% female and 33.7% male were participated in this study as shown in graph 1.

Five therapeutic regimens were used in this study and the following number of patients were enrolled in each treatment group. As shown in Table 3, in every group an equal number of patients was enrolled. Each treatment arm was coded as G1 (Inflame + eye bright lotion), G2 (Rhenicine + eye bright lotion), G3 (G1 + G2), G4 (a combination of five homeopathic mother tincture + eye bright lotion), and G5 (Localen + eye bright lotion).

<table>
<thead>
<tr>
<th>Therapeutic regimen</th>
<th>No of patients enrolled in each treatment group</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>18 (20%)</td>
</tr>
<tr>
<td>G2</td>
<td>18 (20%)</td>
</tr>
<tr>
<td>G3</td>
<td>18 (20%)</td>
</tr>
<tr>
<td>G4</td>
<td>18 (20%)</td>
</tr>
<tr>
<td>G5</td>
<td>18 (20%)</td>
</tr>
</tbody>
</table>

Table 3: Therapeutic regimens

ANALYSIS OF MONITORING PARAMETERS
In each treatment group, different monitoring parameters were evaluated like eye irritation, cough, sore throat, sinusitis, shortness of breath, wheezing, irritation of nose and throat. Eye irritation was present almost in all patients except one patient as shown in graph 2.

At 5th day of follow-up, in the first group, a partial improvement was seen in six patients while in G2 group, total seven patients showed partial improvement, and eye irritation absent in rest of patients. In G3 group, this symptom was still observed in 1 patient while partial improvement was seen in 9 patients and good improvement was seen in 8 patients. In the G4 group, a partial improvement was seen in 9 patients and good improvement was also seen in 9 patients. In the G5 group, total 10 patients showed good improvement while in 8 patients partial improvement was seen. As represented in

Graph 2: Eye Irritation (Baseline trends)

Graph 3: Eye Irritation on the 5th day
graph 3. At 9th day, total six patients discontinued the study while in 69 patients good improvement was seen in every group. In G1 and G2 therapeutic regimens, significant improvement was seen as shown in graph 4. No patient was complained by the end of 9th day about eye irritation. Same trends were seen in G3 and G4 therapeutic regimens.

Out of 90 patients, 89 patients complained about throat irritation. While only one patient had no Throat Irritation on at baseline as shown in graph 5. Present, partially improved and absent scale was used to record the response of patients at baseline, on 5th and 9th day.

At 5th day in the G1 group, 11 patients showed partial improvement, a good improvement was seen in 7 patients while the same trend was seen in the G2 treatment group. In G3, nine patients showed partial improvement and in 9 patients, significant improvement was seen. In G4, a good improvement was seen in only 5 patients while 13 patients showed partial improvement. In G5, throat irritation was present in one patient while partial improvement was seen in 14 patients and absent in 3 patients as shown in Graph 6.

Overall, a good improvement was seen in all treatment groups as shown in graph 7. In G2, an excellent improvement was seen as throat irritation absent in 14 patients and 4 patients showed partial improvement. In this treatment group no the loss of follow-up was observed and all patients stick to their treatment plans. In G1, 14 patients had no throat irritation while 2 patients had a partial improvement in their symptoms. Almost all patients had complained about nose irritation at baseline as shown in graph 8. In G1, 15 patients had nose irritation and only absent in 3 patients.
At the fifth day, in all treatment arms partial and excellent improvement were seen as shown in graph 9. In G1, 12 patients had no complaint of nose irritation while partial improvement was seen in 6 patients. The same trend observed in G2. However, in G3, nose irritation was absent in 8 patients on 5th day while 10 patients showed partial improvement. In G4 and G5, two patients had the complaint of nose irritation but a good improvement was seen in both groups. Overall, significant improvement was seen in all treatment groups. In G1, out of 18 patients, 15 patients had no complaint of nose irritation while 2 patients showed partial improvement and 2 patients didn’t come for a check-up on 9th day. In G2, out of 18 patients, 17 patients had no complaint of nose irritation on 9th day while 1 patient showed partial improvement. In G3, out of 18 patients, 14 patients had no such complaint while partial improvement was seen in 1 patient didn’t come for a check-up on 9th day. In G4, a total of 15 patients had no complaint of nose irritation while 2 patients showed partial improvements and 1 patient didn’t come for a check-up on 9th day. In G5, in total 12 showed good improvement while 4 patients had no such complaint. However, after the use of five therapeutic regimens, only 2 patients had no such complaint.

Graph 7: Throat Irritation on the 9th day

In G2, a total of 17 patients experienced this symptom while 16 patients in G3 had nose irritation. In G4, nose irritation was absent in 8 patients while present in 10 patients. Likewise, in G5 total 12 patients had this complaint while 6 had no such issue.

Graph 8: Nose Irritation (Baseline)

Graph 9: Nose Irritation on the 5th day

was seen in all treatment groups. In G1, out of 18 patients, 15 patients had no complaint of nose irritation while 2 patients showed partial improvement and 2 patients didn’t come for a check-up on 9th day. In G2, out of 18 patients, 17 patients had no complaint of nose irritation on 9th day while 1 patient showed partial improvement. In G3, out of 18 patients, 14 patients had no such complaint while partial improvement was seen in 1 patient didn’t come for a check-up on 9th day. In G4, a total of 15 patients had no complaint of nose irritation while 2 patients showed partial improvements and 1 patient didn’t come for a check-up on 9th day. In G5, in total 12 showed good improvement while 4 patients had no such complaint.
showed partial improvement 2 patient did not come for a check-up on the 9th day.

At 5th day in G1, 9 patients had no complaint of sore throat and partial improvement was seen in 8 patients while present in 1 patient. In G2, excellent results were seen in 12 patients while partial improvement was seen in 6 patients. Same in G3, excellent improvement was seen in 9 patients and partial improvement was shown by 9 patients. The sore throat was partially improved in 11 patients of G4 and absent in 7 patients. In G5, 9 patients had partial improvement in their symptom of sore throat and 8 patients had no such complaints as shown in graph 12.

The sore throat was the major complaint of all patients who suffered from smog-induced health hazards. In G1, G3 and G4, an equal number of patients had a complaint of sore throat as shown in graph 11. In the G2 treatment arm, a total of 16 patients had this problem but absent in 2 patients. While in G5, 15 patients had a sore throat and three patients had no such issue.

In G1, 14 patients had no complaint of a sore throat while 2 patients showed partial improvement. In G2, 18 patients showed excellent results in their symptom of sore throat. While in G3, 14 patients had no complaint of sore throat on the 5th-day visit and 3 patients showed partial improvement. In G4, 2 patients showed partial improvement in their complaint of a sore throat while 15 patients showed excellent result. At 9th day, only 1 patient had a sore throat from G5 but overall good results were obtained as shown in graph 13.

At baseline, all patients had the complaint of cough as shown in graph 14. In G1, 16 patients had a cough and only 2 patients had no such complaint.
Introduction

Causes inflammation of lungs, which results in chest pain, affects human health badly (1). In recent years, there has been a rise in the occurrence of respiratory diseases: A case study of 2016 smog event of Lahore. Environmental monitoring and assessment. 2017;30(1):1-2.

Methods

A prospective comparative study was conducted in Pakistan homeopathic medical college hospital and approved by the ethical review board. Approval was obtained from the ethical review board of the Pakistan homeopathic medical college hospital and the study was conducted from November 2019 to May 2020.

Inclusion criteria were patients willing to participate in the study and able to provide informed consent. Exclusion criteria were patients with a history of allergy, asthma, or chronic obstructive pulmonary disease. Patients with kidney disease were excluded from the study. All those patients with a history of allergy, asthma, or chronic obstructive pulmonary disease were excluded from the study.

The following parameters were measured: Eye irritation, nose irritation, cough, sore throat, sinusitis, and shortness of breath.

Using the Schuette system, medicines were prescribed to every patient. Patients were followed up for 9 days and were evaluated for improvement in symptoms.

Results

Out of 90 patients, 89 patients complained about throat irritation. Almost all patients had complained about nose irritation at baseline. In G2, 11 patients showed partial improvement and in 9 patients, there was no improvement. In G3, nine patients showed partial improvement and in 9 patients, there was no improvement. In G4, 11 patients showed partial improvement and in 9 patients, there was no improvement. In G5, a good improvement was seen in 56 patients and 29 patients had no complaint of cough while 5 patient had complaint of cough as shown in graph 15.

The following trends were obtained in all treatment groups as shown in graph 16. On 9th day, a total of 56 patients had no complaint of cough while partial improvement was seen in 24 patients. However, six patients did come for a check-up on 9th day. Overall, good results were obtained in all treatment arms.

Discussion

Due to intense smog, majority of patients had the presence of elements, which are harmful to living beings. The intense smog is a threat to the health of people. Licorice is an ideal herb for respiratory disorders (23). It is known that licorice has anti-inflammatory properties. It is used in the treatment of allergic rhinitis, and sinusitis (22). Glycyrrhiza Glabra Q, Ocimum sanctum Q and Curcuma Q were used in the treatment of respiratory diseases. 2006;5(4):356-61.

Conclusion

The study concludes that homeopathic medicine is effective in managing respiratory diseases during smog events. Further studies are needed to evaluate the long-term effects of smog on respiratory health.

References


Graph 13: Sore Throat on the 9th day

Graph 14: Cough (Baseline)

Graph 15: Cough on the 5th day

Graph 16: Cough on the 9th day
At baseline, 64 patients had complaint of sinusitis while 26 patients had no such complaint as shown in graph 17. Due to intense smog, majority of patients had the complaint of sinusitis.

Graph 17: Sinusitis (Baseline)

On 5th day in G1, 12 patients had no complaint of sinusitis while 6 patients had partial improvement in their symptom. In G2, a partial improvement was seen in 8 patients while no patients had this complaint.

Graph 18: Sinusitis on the 5th day

After the use of G3, 13 patients had no complaint of sinusitis while 5 patient had partial improvement. In G4, sinusitis was a complaint by one patient and 6 patients had partial improvement in the severity of sinusitis as shown in graph 18.

Overall, excellent results were seen in all treatment arms. In G1, excellent results were seen in 12 patients while 4 patients showed partial improvement. 15 patients had no complaint of sinusitis on 9th day while 3 patients showed partial improvement as shown in graph 19. In G3, sinusitis was absent in 15 patients and 2 patients showed partial improvement. 15 patients showed excellent results in G4 while 1 patient had the complaint of sinusitis and one patient showed partial improvement. In G5, a good improvement was seen in 13 patients while 2 patients showed partial improvement and one had the complaint of sinusitis.

Graph 19: Sinusitis on the 9th day

Smog affects the respiratory system of humans and it causes shortness of breath. Homeopathic medicines found to be effective in such conditions. 32 patients had the complaint of shortness of breath while 32 patients had no complaint a shown in graph 20.
Air pollution is a big environmental problem and it also induced health hazards. Therapeutic regimens dispensed in patients with smog hazards including eye irritation and RTIs. Following five homeopathic medicines were used in patients who had homeopathy has been found to be effective in the means similar, and pathos mean disease or suffering. This health (13).

Air pollution is the major problem in all big cities of the world due to industrialization and inefficient transportation systems. In Lahore, the situation is more critical due to the not-up-to-mark public transport system with the increasing number of vehicles. Due to intense smog, majority of patients had the complaint of sinusitis. Due to smog induced health hazards, asthmatic patients feel difficulty in breathing and in this situation homeopathic medicines are the first choice of majority of patients. Total 90 patients were enrolled in this study, out of which 41 patients had complaint of wheezing while 49 patients had no such issue as shown in graph 23.

On 9th day, very good results were seen in all treatment groups while G2 treatment arm showed excellent trends as shown in graph 22. In G1, 12 patients had no complaint of shortness of breath and 4 patients showed partial improvement. In G3, shortness of breath was absent in 16 patients while 1 patient showed partial improvement. In G4, 15 patients had no complaint while one patient showed partial improvement and one had the problem of shortness of breath. In G5, 2 patients had shortness of breath while 10 patients showed excellent improvement and 4 patients had partial improvement.

Graph 20: Shortness of breath (Baseline)

Total 90 patients were enrolled, out of which 58 patients had no complaint of shortness of breath while 28 patients showed partial improvement and 4 patients had the complaint as shown in graph 21. Overall, excellent results were obtained in all treatment arms on 5th day. The G2 treatment arm was more effective in shortness of breath while other regimens also showed good results.

Graph 21: Shortness of breath on the 5th day

Due to smog induced health hazards, asthmatic patients feel difficulty in breathing and in this situation homeopathic medicines are the first choice of majority of patients. Total 90 patients were enrolled in this study, out of which 41 patients had complaint of wheezing while 49 patients had no such issue as shown in graph 23.

On the 5th day, after the use of homeopathic medicines 68 patients had no complaint of wheezing while only 2 patients had this complaint. Partial improvement was seen in 20 patients as shown in graph 24.

Graph 22: Shortness of breath on the 9th day

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INTRODUCTION

Before the initiation of the study. In this study, the safety and efficacy of different homeopathic regimens for the treatment of all diseases (16). That is why in this study, elements are may be particulate matters, ozone, oxides of industrialization are the main reasons behind this situation in Lahore City (8). Increasing population and growing city (9) performed at baseline and on completion of study. Complete blood count, liver and renal functions tests were performed to ensure safety. The baseline data was analyzed by comparing the mean using SPSS as shown in table 5. AST total mean value at baseline as shown in graph 13.

G1 treatment arm showed more good results as compared to other although. Overall, excellent results were seen in all groups.

SAFETY

The safety aspect of all treatment arms was monitored. Blood sampling was carried out for this purpose. Complete blood count, renal function test, and liver function tests were performed to ensure safety. The baseline data was analyzed by comparing the mean using SPSS as shown in table 4. Mean value and standard deviation of every treatment arm was evaluated. At baseline, AST mean value 35.98 and standard deviation 13.65 was recorded. Overall, the total mean value of ALT 37.93 and standard deviation 24.74 was recorded. Likewise, other parameters were recorded and evaluated as shown in the table below. No association was found between therapeutic regimens and baseline safety parameters. Graphical representation of all parameters also shown in graph 26.

Graph 23: Wheezing (Baseline)

G1 treatment arm showed more good results as compared to other although Overall, excellent results were seen in all groups.

Graph 24: Wheezing on the 5th day

In G1, 15 patients had no complaint of wheezing while one patient showed partial improvement as shown in graph 25. G2 treatment arm showed excellent result while in G3 16 patient had no complaint of wheezing and 1 patient showed partial improvement. In G4, excellent improvement was seen in 15 patients while one patient showed partial improvement and one patient had complaint of wheezing. In G5, good improvement was seen in 12 patients and 3 patients showed partial improvement.

Graph 25: Wheezing on the 9th day

Graph 26: Wheezing on the 9th day

In G1, 15 patients had no complaint of wheezing while one patient showed partial improvement as shown in graph 25. G2 treatment arm showed excellent result while in G3 16 patient had no complaint of wheezing and 1 patient showed partial improvement. In G4, excellent improvement was seen in 15 patients while one patient showed partial improvement and one patient had complaint of wheezing. In G5, good improvement was seen in 12 patients and 3 patients showed partial improvement.

Table 2: Basic Demographics

| Gender, area of residence, basic education, household demographics of all patients were obtained at baseline. | Graph 12: Cough (Baseline) | Graph 17: Cough On the 5th Day | Graph 18: Cough On the 9th Day |

Graph 12: Cough (Baseline)

Graph 17: Cough On the 5th Day

Graph 18: Cough On the 9th Day

Graphical representation of all parameters also shown in graph 26.
Air pollution is a big environmental problem and it also

INTRODUCTION

Smoke and fog when combines it becomes smog. The elements are may be particulate matters, ozone, oxides of nitrogen, ultraviolet light, and other gases and particulate matter that are released into the atmosphere. The main source of air pollution is from human activities, such as burning fossil fuels for energy, transportation, and industrial processes. The air pollution can cause serious health problems and can also affect the environment, such as the depletion of the ozone layer.

A prospective comparative study was conducted in this clinical trial was conducted to evaluate the safety and efficacy of different homeopathic regimens for the treatment of smog-induced respiratory diseases: A case study of 2016 smog event of Lahore. The main aim of this study was to compare the safety and effectiveness of five different regimens and evaluate the patients' symptom severity in smog-affected patients but only five patients showed no interest in a future visit to the study. Both male and female patients of age 7-85 years were enrolled in this study. Patients with irritation of eye, sore throat, one patient had coughed, one patient had an excellent improvement. While on 9th day, six patients discontinued the use of five therapeutic regimen.

Complete blood count, liver and renal functions tests were performed at baseline and on completion of study (9th day). The correlation was seen in all groups. Following trends were seen in all treatment arm, a total of 16 patients had this problem but absent in 3 patients. Three patients had no such issue. No patient was complained by the end of 9th day about eye irritation and only absent in 3 patients. The breathing problem was severe in the G1 group and was mostly due to shortness of breath and wheezing but after the use of five therapeutic regimen, excellent improvement was seen on 5th day and on 9th day although 9 patients showed partial improvement. Overall, the G1 regimen as shown in table 1.

In G2, 17 patients had nose irritation at baseline. After the use of G1 therapeutic regimen excellent improvement was seen on 5th day and on 9th day although 9 patients showed partial improvement. The same trend was seen in G3 and G4 therapeutic regimens.

Graph 10: Nose Irritation on the 9th day

Graph 12: Sore Throat on the 5th day

Graph 14: Cough (Baseline)

Graph 17: Sinusitis (Baseline)

Graph 20: Shortness of breath (Baseline)

The values. Following trends were seen in all treatment arms, a total of 16 patients had this problem but absent in 3 patients. Three patients had no such issue. No patient was complained by the end of 9th day about eye irritation and only absent in 3 patients.

Table 4: Baseline safety profile

<table>
<thead>
<tr>
<th>Therapeutic Regimen</th>
<th>Baseline Mean and std deviation</th>
<th>Baseline AST</th>
<th>Baseline ALT</th>
<th>Baseline Serum creatinine</th>
<th>Baseline RBC</th>
<th>Baseline PLT</th>
<th>Baseline WBC</th>
<th>Baseline Hb</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>Mean</td>
<td>32.8550</td>
<td>34.917</td>
<td>1.39</td>
<td>4.4600</td>
<td>280.000</td>
<td>7.500</td>
<td>12.75</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>10.47898</td>
<td>9.3547</td>
<td>.373</td>
<td>.41737</td>
<td>72.6717</td>
<td>1.6845</td>
<td>1.66</td>
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<tr>
<td>G2</td>
<td>Mean</td>
<td>36.0778</td>
<td>38.150</td>
<td>1.34</td>
<td>4.5328</td>
<td>254.111</td>
<td>8.606</td>
<td>12.71</td>
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<tr>
<td></td>
<td>Std. Deviation</td>
<td>12.38564</td>
<td>17.9555</td>
<td>.394</td>
<td>.48692</td>
<td>91.6611</td>
<td>2.2293</td>
<td>1.82</td>
</tr>
<tr>
<td>G3</td>
<td>Mean</td>
<td>34.3583</td>
<td>33.161</td>
<td>1.56</td>
<td>4.3461</td>
<td>295.444</td>
<td>8.711</td>
<td>13.04</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>7.34079</td>
<td>13.6370</td>
<td>.773</td>
<td>.70504</td>
<td>98.5538</td>
<td>2.4760</td>
<td>2.57</td>
</tr>
<tr>
<td>G4</td>
<td>Mean</td>
<td>39.1333</td>
<td>46.972</td>
<td>1.35</td>
<td>4.5817</td>
<td>260.389</td>
<td>8.189</td>
<td>13.91</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>23.96009</td>
<td>48.7071</td>
<td>.317</td>
<td>.61966</td>
<td>79.1136</td>
<td>1.8509</td>
<td>6.05</td>
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<tr>
<td>G5</td>
<td>Mean</td>
<td>37.5000</td>
<td>36.450</td>
<td>1.39</td>
<td>4.5561</td>
<td>322.389</td>
<td>10.094</td>
<td>13.01</td>
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<tr>
<td></td>
<td>Std. Deviation</td>
<td>7.64914</td>
<td>10.6697</td>
<td>.335</td>
<td>.61527</td>
<td>258.5662</td>
<td>7.3068</td>
<td>3.23</td>
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<tr>
<td>Total</td>
<td>Mean</td>
<td>35.9849</td>
<td>37.930</td>
<td>1.40</td>
<td>4.4953</td>
<td>282.467</td>
<td>8.620</td>
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</tr>
</tbody>
</table>

Correspondance: info@ijhcam.org
On 9th day, a blood test was again performed to evaluate the values. Following trends were seen in all treatment arms as shown in table 5. AST total mean value at baseline 35.98 and on 9th day 36.57 was recorded. The mean and the standard deviation was evaluated in all groups at baseline and on 9th day. An in-significant correlation was seen in all groups.

<table>
<thead>
<tr>
<th>Therapeutic Regimen</th>
<th>9th Day Mean and std deviation</th>
<th>9th Day</th>
<th>9th Day</th>
<th>9th Day</th>
<th>9th Day</th>
<th>9th Day</th>
<th>9th Day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9th Day Mean</td>
<td>9th Day</td>
<td>9th Day</td>
<td>9th Day</td>
<td>9th Day</td>
<td>9th Day</td>
<td>9th Day</td>
</tr>
<tr>
<td>G1</td>
<td>Mean: 37.61</td>
<td>35.09</td>
<td>1.49</td>
<td>273.56</td>
<td>6.54</td>
<td>11.67</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation: 8.926</td>
<td>8.661</td>
<td>.326</td>
<td>.444</td>
<td>66.589</td>
<td>2.300</td>
<td>1.404</td>
</tr>
<tr>
<td>G2</td>
<td>Mean: 36.02</td>
<td>37.67</td>
<td>1.58</td>
<td>250.83</td>
<td>8.82</td>
<td>11.9</td>
<td></td>
</tr>
<tr>
<td>G3</td>
<td>Mean: 34.61</td>
<td>33.20</td>
<td>1.55</td>
<td>293.94</td>
<td>7.07</td>
<td>12.58</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation: 11.876</td>
<td>13.576</td>
<td>.361</td>
<td>.775</td>
<td>99.251</td>
<td>1.694</td>
<td>2.15</td>
</tr>
<tr>
<td>G4</td>
<td>Mean: 35.79</td>
<td>38.31</td>
<td>1.48</td>
<td>280.94</td>
<td>7.45</td>
<td>12.67</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation: 8.944</td>
<td>21.830</td>
<td>.351</td>
<td>.532</td>
<td>83.787</td>
<td>1.754</td>
<td>2.62</td>
</tr>
<tr>
<td>G5</td>
<td>Mean: 39.08</td>
<td>34.74</td>
<td>1.54</td>
<td>306.13</td>
<td>7.13</td>
<td>12.94</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation: 8.347</td>
<td>8.792</td>
<td>.413</td>
<td>.824</td>
<td>288.225</td>
<td>2.021</td>
<td>2.05</td>
</tr>
<tr>
<td>Total</td>
<td>Mean: 36.57</td>
<td>35.84</td>
<td>1.53</td>
<td>280.51</td>
<td>7.43</td>
<td>12.35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation: 9.736</td>
<td>14.258</td>
<td>.344</td>
<td>.612</td>
<td>147.932</td>
<td>3.084</td>
<td>2.05</td>
</tr>
</tbody>
</table>

Baseline and 9th-day ANNOVA table 6 represents no significant relationship between therapeutic regimens and safety values. In all treatment arms, non-significance trends were seen which means all therapeutic regimens has no negative effect on C.B.C, liver and renal functions as shown in table 6. Interestingly no association was found between therapeutic regimens and safety parameters.

**DISCUSSION**

Due to air pollution, millions of people died every year around the world and air quality issues are growing in many developing countries (17). Smoke and fog when combines it becomes smog. Smog causes irritation of eye, nose, and throat. Eye irritation is the major complaint of smog affectees (18). The main aim of this study was to evaluate the safety and efficacy of homeopathic regimens in smog induced health hazards including eye irritation and respiratory tract infections. Eye irritation, irritation of nose and throat, sore throat, cough, sinusitis, shortness of breath and wheezing was the monitoring parameters, which was evaluated in every patient. Five therapeutic regimens were dispensed to patients and...
Introduction

Study Design

The efficacy of different homeopathic regimens for the treatment of smog-induced respiratory and allergic conditions in Lahore, Pakistan (7). Especially, Lahore is the second most polluted city in the world and air quality issues are growing in cities around the world and air quality issues are growing in cities around the world and air quality issues are growing in cities around the world and air quality issues are growing in cities around the world.

Complete blood count, liver and renal functions tests were performed at baseline and on 9th day. As we know, Smog is a form of air pollution and it affects human health badly (19). It causes many health issues including eye irritation, difficulty in breathing, cough etc. (5). That is why all patients had all these complaints. All patients had complaint irritation of throat but the majority of patients had partial improvement in their symptoms after the use of homeopathic medicines. However, after the use of G2, throat irritation was still present in one patient on 5th day. Total 58 patients showed partial improvement and 31 patients had no complaint of throat irritation on 5th day. Partial improvement was seen in 15 patients and 68 patients had no complaint on 9th day. Overall, Significant results were obtained in all treatment arms. Therefore, all five therapeutic regimens are safe and effective for the treatment of smog induced respiratory and allergic conditions.

Table 6: Level of significance among all therapeutic regimens evaluated by using ANNOVA test

<table>
<thead>
<tr>
<th>Therapeutic Regimen</th>
<th>Significance (On Baseline)</th>
<th>Significance (On 9th Day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th day AST*</td>
<td>.675</td>
<td>.726</td>
</tr>
<tr>
<td>9th day ALT*</td>
<td>.500</td>
<td>.829</td>
</tr>
<tr>
<td>9th Day Serum Creatinine*</td>
<td>.608</td>
<td>.917</td>
</tr>
<tr>
<td>9th day RBC*</td>
<td>.746</td>
<td>.250</td>
</tr>
<tr>
<td>9th day PLT*</td>
<td>.585</td>
<td>.854</td>
</tr>
<tr>
<td>9th day WBC*</td>
<td>.338</td>
<td>.251</td>
</tr>
<tr>
<td>9th day HGB*</td>
<td>.755</td>
<td>.339</td>
</tr>
</tbody>
</table>

Each regimen was code as G1, G2, G3, G4, and G5. Eye bright lotion was dispensed along with every therapeutic regimen as shown in table 1. Total 90 patients were enrolled for the duration of 9 days and in each regimen, equal numbers of patients were enrolled. Eye irritation was a complaint by all patients at baseline but after the use of homeopathic medicines, very good improvement was seen. At baseline, 89 patients had a complaint of eye irritation and one patient had no such complaint. However, after the use of five therapeutic regimens on 5thday, 39 patients had partial improvement and 50 patients showed good improvement. While on 9th day, six patients’ discontinued the study and excellent improvement was seen in 69 patients. In G1 and G2 therapeutic groups, a good improvement was seen on 5th day and on 9th day although rest of therapeutic regimens also showed good results.
were seen in G2 as compared to other therapeutic regimens. At baseline in G1, total 15 patients had complaint of nose irritation, 17 had a sore throat, 16 had a cough, 11 had sinusitis, 12 had shortness of breath and 5 has wheezing. On 5th day, only 6 patients showed partial improvement in their symptoms while the rest of patients had no complaint of nose irritation and on 9th day only one patient showed partial improvement. Overall, the G1 therapeutic regimen effectively covered this issue in all patients. Sore throat is a very common issue and Air pollution is the common cause of it (20). The sore throat was a complaint by the majority of patients but after the use of G1 therapeutic regimen excellent improvement was seen in all patients on 5th and 9th day. On 9th day only two patients showed partial improvement while 14 patients had no complaint of sore throat At baseline 16 patients had complaint of cough but after the use of homeopathic medicine G1 only 1 patient had complaint of cough and rest of patients showed excellent results. Likewise, 11 patients had sinusitis issue but on 9th day, no patient had such complaint. G1 therapeutic regimen also showed good improvement in all those patients who had complained about the shortness of breath and wheezing. In G2, 17 patients had nose irritation at baseline. After the use of homeopathic medicine G2, only one patient showed partial improvement while rest of the patients had no complaint on 9th day. The sore throat was also a complaint by the majority of patients but on 9th day, interestingly sore throat was absent in all patients. In recent years, respiratory allergies such as asthma have increased. Ambient air pollution plays an important role to increase the prevalence of such allergies (21). Cough, sinusitis, shortness of breath and wheezing was also a complaint by the majority of patients but after the use of homeopathic medicine G2, an excellent improvement was seen in all smog affected.

G1 and G2 were combined used in G3 therapeutic regimen. Total 16 patients had nose irritation while 2 patients had no such complaint at baseline. On 5th and 9th day, an excellent improvement was seen in all patients after the use of homeopathic medicine G3. The sore throat was present in 17 patients and absent in 1 patient. However, after the use of homeopathic medicine G3, 9 patients showed partial improvement while 9 patients had no such complaint on 5th day. On 9th day sore throat was absent in 14 patients and 3 patients showed partial improvement. The cough was also a complaint of almost all patients but an excellent improvement was noted in all patients on 9th day. At baseline, patients had complaint of sinusitis, Shortness of breath and wheezing but after the use of G3 therapeutic regimen significant improvement was seen.

At baseline in G4, total 10 patients had complaint of nose irritation, 17 had a sore throat, 17 had a cough, 12 had sinusitis, 12 had shortness of breath and 10 has wheezing. After the use of homeopathic medicine G4, no patient had complaint of nose irritation on 9th day. Only one patient had complaint of cough, sinusitis, shortness of breath and wheezing on 9th day.

G4 therapeutic regimen was prepared by mixing of 5 homeopathic mother tinctures, Zingiber Q, Eucalyptus Q, Glycyrrhiza glabra Q, Ocimum sanctum Q and Curcuma longa Q. Zingiber Officianalis (Ginger) is used as an anti-inflammatory for the relief of sore throat, cough, allergic rhinitis, and sinusitis(22). Glycyrrhiza Glabra (Licorice) is used for cough, asthma, and bronchitis. Licorice is an ideal herb for respiratory disorders (23). It has anti-inflammatory properties during allergic reactions (24). Tulsi (Ocimum Sanctum) is a very good remedy for sore throat, asthma, bronchitis and allergic conditions of the throat (25). Curcuma Longa is best for Respiratory disorders. It has anti-asthmatic properties (26). Eucalyptus can be used as a topical application for inhalation in the treatment of sore throat, sinusitis, asthma, and congestions (27).

At baseline in G5, 12 patients had nose irritation, 15 had a sore throat, 17 had coughed, 15 had sinusitis, 14 had shortness of breath, and 12 had wheezing issues. After the use of therapeutic regimen G5, excellent results were
seen on 5th and 9th day. On 9th day, no patients had complaint of nose irritation while 1 patient had a sore throat, one patient had coughed, one patient had sinusitis, 2 had shortness of breath, and 1 had patient still had a wheezing problem.

It is very important to monitor the safety profile of homeopathic medicines. That is why in this clinical trial, the safety aspect was evaluated in all patients. For that purpose complete blood test, liver function test and renal function test was performed at baseline and on 9th day. Tremendously, the relationship between treatment regimens and CBC, RFT & LFT is insignificant, meaning none of the treatment arm affecting liver, kidneys, and blood production. Thus, all five therapeutic regimens are safe and effective for the treatment of smog induced health hazards.

CONCLUSION

All therapeutic regimens were equally effective to control symptom severity in smog-affected patients but excellent results were seen in G2 therapeutic regimen. More interestingly all patients from G2 therapeutic regimen completed this study. Hence, this clinical trial proves that all five therapeutic regimens are safe and effective for the treatment of smog induced health hazards. All five therapeutic regimens are very effective in the treatment of eye, nose and throat irritation, sore throat, cough, sinusitis, shortness of breath, and wheezing.

REFERENCES

15. Aversa R, Petrescu RV, Apicella A, Petrescu FL. About homeopathy or Similia similibus currentur American
Affects human health badly (1). In recent years, there has been global concern over air pollution as a big environmental problem and its impact on human health. Air pollution is defined by the World Health Organization as the presence of particulate matter, nitrogen oxides, sulfur dioxide, carbon monoxide, and other toxic gases in the air. It is estimated that millions of people die every year due to the effects of air pollution on human health.

**INTRODUCTION**

Air pollution is a major problem in all big cities of the world due to reasons such as industrial activities, transportation, and burning of fossil fuels. Over the years, various national and international organizations have established guidelines to control air pollution. Compliance with these guidelines has reduced air pollution to some extent, but a significant amount of pollution still exists.

**DATA COLLECTION**

A prospective comparative study was conducted in this clinical trial to evaluate the safety and efficacy of four therapeutic regimens. Approval was obtained from the ethical review board of the institute, and written informed consent was obtained from all patients. The study included 90 patients with respiratory complaints, and they were randomly allocated to four treatment arms: G1, G2, G3, and G4. The primary outcome measure was the improvement in respiratory symptoms, and secondary measures included laboratory parameters and patient-reported outcomes.

**EXCLUSION CRITERIA**

Patients with acute respiratory infections, chronic respiratory diseases, and those on medication for respiratory conditions were excluded from the study.

**RESULTS**

A total of 36.4% males and 63.6% females were enrolled in the study, with a mean age of 39.6 years. The most common symptoms reported by patients were eye irritation, cough, sore throat, and throat irritation. Results were obtained in all treatment arms on 5th day but no patient was complained by the end of 9th day about eye irritation.

Overall, a good improvement was seen in all treatment arms as shown in graph 1. On 5th day, only 6 patients showed partial improvement in G1, while in G2, 10 patients showed partial improvement. In G3, 12 patients showed partial improvement, while in G4, 14 patients showed partial improvement. Overall, excellent results were seen in all treatment arms on 9th day. On 9th day, overall good results were obtained in all treatment arms on 9th day as shown in graph 2.

**CONCLUSION**

In summary, the use of homeopathic medicine is an effective way to treat respiratory symptoms caused by air pollution. Further research is needed to determine the long-term effects of air pollution on human health.

**REFERENCES**