

## Potential Effects of Domestic Energy on the Health of Women

By

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### SUMMARY

**Objective:** To highlight the various potential health problems women and others exposed to gases/substances emitted from domestic sources of energy are at risk of. A review of the literature on the health problems associated with use of various forms of energy fuels was done.

**Review:** Not much literature has emanated from Nigeria on the health effects on users of domestic energy. Sources of domestic energy in Nigeria include coal; firewood; kerosene; liquefied natural gas (LNG); electricity and sawdust. The gaseous and other chemical emissions by these materials in the course of energy production have been recorded as having adverse effects on the health of the users and other exposed persons.

In Nigeria, the bulk of the domestic chores during which people are exposed to the effects of these gases, are done by women.

Conditions such as cooking in overcrowded areas predispose to the different health problems. With a source such as coal, users in overcrowded areas experience health problems such as asthma, chronic cough, eye irritation, headache and others.

**Conclusion:** The health effects of exposure to emissions from domestic energy sources are felt mostly by women. Different levels of risks are associated with different energy fuels with coal the most hazardous. Most of the damage is to the respiratory system. There is a need for clinical and epidemiological data to be collected and collated to study the problem.

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**Key Words:** *Energy use, Pollutants, Environmental damage*

### INTRODUCTION

The sources of energy for both industrial and domestic purposes vary depending on factors of availability, cost and convenience. In the homes, substances such as coal, kerosene, firewood, electricity, sawdust and others are used to supply heat energy for cooking. In cold climates heat energy is also required for keeping the living rooms warm in winter.

Evidence has shown that the process of obtaining energy from these sources/materials also produce chemical residues that emit dangerous gases which directly and indirectly adversely affect the environment and the health of users and the community of exposed persons<sup>1-3</sup>. When these same materials are used to provide domestic energy, it could be reasoned that the same emitted chemicals and gases are hazardous to the health of the users and other exposed persons.

By their cultural and gender roles in the home, Nigerian women do the bulk of the domestic chores in which domestic energy is produced and utilized. It therefore follows that most of the adverse effects of the products of combustion of these fuels would be felt by women.

Not much work has been done locally on the health impact of the use of domestic energy on women. From Singapore<sup>4</sup> comes a report that respiratory symptoms occur and the lung functions are impaired in non-smoking women exposed to domestic cooking gas. It was therefore decided to document the various effects on the health of exposure to emissions from various potential sources of domestic energy that has been published. These effects could be extrapolated to be similar to the hazards that the Nigerian women are exposed to in the course of producing and utilizing

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domestic energy. Such information would form a basis for health education and awareness creation programmes aimed at limiting and preventing these hazards.

### POTENTIAL HEALTH HAZARDS OF DOMESTIC ENERGY

Table 1 shows the known health problems resulting from exposure to various sources of energy. The common sources of domestic energy in use include gas stoves and ovens; kerosene stoves; firewood and saw dust stoves; and electric stoves.

**TABLE 1 HEALTH PROBLEMS ASSOCIATED WITH DIFFERENT SOURCES OF DOMESTIC ENERGY**

Health Problem	Type of Domestic Energy Source			
	LNG*	Coal	Kerosene	Firewood
Phlegm	20	11	5	20
Nasal discharge	12	50	14	12
Asthma	2	5	3	2
Emphysema	12	15	13	12
Flu epidemics	2	3	2	2
Tachycardia	7	40	9	7
Premature babies	16	24	12	16
Low birth-weight babies	17	28	10	17
Metaplasia of bronchial epithelium	30	32	20	30
Atelectasis	3	21	2	3
Pneumonia	1	5	1	1
Chronic cough	40	33	38	40
Hair loss	14	21	18	14
Headache	2	2	1	2
Eye irritation	22	23	21	22
Chromosomal abnormalities	9	15	10	9
Bronchitis	16	30	12	16

\* LNG: Liquefied natural gas

The figures represent the percentage of persons exposed who develop a particular health problem

The health problems occur as a result of exposure to the smoke produced by burning the various domestic, industrial and vehicular fuels. The smoke so produced contains dangerous chemicals and gases, which on inhalation predisposes the individual to the listed health problems<sup>1-5</sup>. These gases include ozone, nitrogen dioxide, sulphur dioxide and common monoxide. The higher the amount of smoke and energy related pollution in the atmosphere, the higher the respiratory associated mortality in such places.

In some instances, these gases are known to contaminate the breast milk in nursing mothers thereby also endangering the lives of the suckling babies<sup>6,7</sup>. Some of these pollutants, including sulphur oxide, ozone, carbon monoxide, oxides of nitrogen and volatile organic compounds accumulate in the body systems of those exposed<sup>8</sup>.

Women and other persons exposed to smoke from domestic energy are particularly at risk of developing among other problems, nasal discharge, tachycardia, asthma and phlegm<sup>9,10,11</sup>. Oxides of nitrogen act indirectly by producing photochemical substances which with other chemical agents in the atmosphere affect health adversely<sup>12,13</sup>. Indoor cooking with gas stoves and cigarette smoking increase the concentration of nitric oxide<sup>14,15</sup> in the living home environment. Ultraviolet lamps, electrostatic precipitators<sup>15</sup>, photocopying machines and odour control equipment<sup>16,17</sup> cause the production of ozone. When inhaled ozone damages the respiratory tract, especially the lung parenchyma and adversely affects the reproductive system<sup>18,19</sup>. High concentrations of ozone cause metaplasia and fibrosis of the bronchiolar epithelium while continuous exposure to even low concentrations of ozone causes atelectasis, bronchopneumonia and emphysema.

A high incidence of lung cancer and cardiovascular diseases is found in places where there is no demarcation between industrial plants and residential areas. The risks are higher when coal-powered plants are used. Such places

have high concentrations of nitrogen oxide, sulphur dioxide and carbon monoxide in the atmosphere. The amount of sulphur produced from energy use in the rural communities is about half of that in the urban metropolis. This is probably as a result of industrial production and motor vehicular exhaust fumes which are generated more in the city centres than in rural areas<sup>16</sup>.

In places where coal is used to heat the living rooms during the winter, the reproductive health of individuals is affected. About 55% of pregnant women in such places have premature and low birth weight babies as well as miscarriages. Babies with congenital abnormalities were born to 60% of such women while 35% of the exposed men have semen of low quality. Smoke from coal and firewood have effects similar to that of cigarette smoking<sup>19</sup>.

Ozone at a concentration of 740g/m<sup>3</sup> and sulphur dioxide at 960g/m<sup>3</sup> have synergistic action and individuals exposed to these gases suffer from chronic obstructive airway diseases<sup>18</sup>.

## CONCLUSIONS

There are different levels of risk associated with different energy sources. It seems as if there is nothing to choose between natural gas and firewood. Generally, it is most risky to use coal, followed by natural gas and firewood with kerosene being the safest. This analysis should guide families in selecting the type of domestic fuel to use.

Most harmful effects were on the respiratory tracts and the respiratory associated mortality rates depend on the amount of smoke produced by a particular source. The high-smoke producing fuels produce more respiratory health problems.

Use of certain types of fuel in the city centres would worsen an already badly polluted environment. Use of such domestic energy source such as coal and fire wood in families living in cities or where some persons are

smokers compounds the problem of those who use domestic energy.

As much as is feasible, cooking with whichever energy source should be in the open and less crowded areas to enhance atmospheric dissipation and lessen the domestic concentration of the harmful gases. This would lessen the harmful effects on the women.

There is a need for epidemiological studies to assess the magnitude of the problem posed to women by different domestic energy sources.

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