

Prevalence of Acute Respiratory Infections among children under five years age living near Brick Kilns

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ABSTRACT

Aim: To determine the prevalence of ARI under five children living near kiln industry at Taluka Sobhodero, Sindh and to compare the prevalence of ARI under five children living near kiln industry to those living away from Kiln industry at Taluka Sobhodero, Sindh.

Study design: Comparative cross sectional.

Place and duration of study: Taluka Sobhodero, District Khairpur, Sindh, 20-04-2011 to 03-04-2011

Methods: This study was conducted on 188 children of two villages at Taluka Sobhodero, Distt; Khairpur (Mir's).

Results: ARI prevalence in village Khokhar (located near kilns) was 24.5% compared to 12.8% in village Memon located away from kilns. The children under the age of 5 years involved in study were from similar socio economic back grounds. Prevalence of acute respiratory infection was higher in children living near kiln industry as compared to those living away from kilns, Chi-square; a test of significant was applied and results were significant at p value <.03.

Conclusions: ARI cases were more in under-5 children sharing their bed room with 3 or more compared to those sharing with 1 or 2 people (80% v/s 20%, p value <.011).

Keywords: Acute respiratory tract infections, children <5 years age, brick kiln pollution.

INTRODUCTION

The United Nations Convention on the Right of the Child states that the child has the right to the highest attainable level of health and right to a safe environment. Moreover, mortality and morbidity in children less than 5 years serve as a good indicator of the population well being. Children under 5 years constitute about 9.4% of the total global population². Acute respiratory infections (ARI) are currently one of the leading causes of death in children below 5 years of age in the world¹.

Globally air pollution is an important factor responsible for children ill health. Unhealthy air is breathed by an estimated 1.1 billion people and claims 3 million lives a year³. Majority of this ill health are proved to be due to respiratory infections. Studies conducted in Europe report that the incidence of acute respiratory infections is up to 50% higher in children living in the most polluted

areas than in those in the least polluted areas. The most significant health effects of outdoor air pollution are associated with particulate matter (PM)⁴.

Acute respiratory infections annually kill an estimated two million children under the age of five. As much as 60 percent of acute respiratory infections worldwide are related to environmental conditions⁵. ARI is globally spread, although it has differing impacts between developing and developed nations. In both developing and developed countries, most children under 5 years of age experience between 4 to 6 episodes of ARI annually (WHO, 2006). The overwhelming majority of ARI deaths and severe illness episodes are due to acute lower Respiratory Infections (ALRIs)⁶; about 4.2 million ALRI deaths are estimated to occur among all age groups; of these 1.8 million are estimated to occur among children 1-59m⁷. Majority of deaths are preventable and treatable through simple, affordable interventions⁸. The incidence of ARIs in children aged less than 5 years is estimated to be 0.29 and 0.05 episodes per child-year in developing and industrialized countries, respectively, which translates into 151 million and 5 million new episodes each year, respectively. Most cases occur in India (43 million), China (21million), Pakistan (10 million), Bangladesh, Indonesia and Nigeria (56 million each)⁹. According to PDHS 2006-07, ARI prevalence in children under 5 years

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of age in Pakistan is 14%. It provides data of ARI considering age, sex, cooking fuel and income etc but does not mention outdoor pollution as one of the risk factors for ARI¹⁰.

METHODOLOGY

This study was conducted during the period of April 2011 to May 2011 at Taluka Sobhodero, District Khairpur. The area close to brick kilns was defined as high risk area and area far away from kilns will be regarded as low risk area in the study. Study population was Children (<5 years age) of Tehsil Sobhodero, district Khairpur (Mir's) Sindh. Sampling technique used was convenient sampling technique. Children aged <5 years irrespective of sex were included in the study while children having debelating illness, T.B, Asthma, mental disability, malnourished children were excluded. Sampling size was $194/2 = 97$ from each village near kilns and far away from kilns.

RESULTS

This study was carried out at two villages namely village Khokhar (located near brick kilns) and village Memon (located far away from brick kilns) at Taluka Sobhodero, Distt: Khairpur (Mir's) Sindh. A questionnaire and field guide was used for data collection. Interviews were taken from the mothers having children under the age of 5 years. 6 children were excluded due to malnutrition and remaining 188 children were studied with male to female ratio was 1.3:1. Children of <5 years age from two villages (Village "Khokhar" near brick kilns and Village "Memon" far away from brick kilns) were compared on the basis of Acute Respiratory Infection in last two weeks. 1 tailed (sided) Chi Square; a test of significance was applied for the results. ARI was higher in children under the age of five living near brick kilns compared to those living away from the kilns (24.5% v/s 12.8%, p value <.030).

DISCUSSION

Main objective of the study was to determine morbidity of acute respiratory infection in under-5 children living near kiln industry and to compare the prevalence of acute respiratory infection in under-5 children living near kiln industry to those living away from kiln industry. The aim and objective of the study was to build evidence of the environmental impacts of brick kilns on children, since such evidence is scarce and paid less attention in our country. Linked to this is perhaps poor legislation

regarding the environmental hazards of pollution due to these kilns²⁷.

Acute respiratory infections (ARI) also have received far less attention in humanitarian relief policies and programmes in Pakistan. As it is a public health problem, so long term effects of air pollution and other environmental hazards must be highlighted at public and policy level to save the lives of children and to secure their future. The current study proposes to decrease morbidity in children less than five years of age due to ARI living near brick kilns. With the idea that this study will help identify kiln emissions as a potential risk for ARI among children; it will also help in putting up recommendations for the policy makers to help this industry regulate emissions for the larger public health and environmental interest²⁸.

Children under the age of 5 years from two villages namely Village Khokhar, located near to brick kilns and Village Memon located far away from kiln industry were studied for the prevalence for acute respiratory infection and compared to observe the difference. Cases of ARI were higher in village Khokhar (located near kilns) compared to village Memon located away from kilns (24.5% v/s 12.8%, p value <.030). The children under the age of 5 years involved in the study were from similar socio economic back grounds. As the distance between two villages is just about 5 kilometers, there were not too much socio economical and cultural variations. There was much similarity between the mothers of two villages regarding socio-cultural norms and religious beliefs. Children were categorized on the basis of age into three groups. Age of more than 60% of the children from both villages was between 12-59 months. Literacy rate in mothers was very low, almost 90% of the mothers were illiterate and only 2% of the mothers from both villages attained the highest level of matriculation. Majority, 97% of the mothers were house wives. Agriculture is the main earning source on which villagers depend for most of their income. Fathers education was also low, 56% were reported as illiterate. Only 9% of the fathers were government employees. About three fourths of the families had joint family system. Although living near kilns, 41.5% families live in Katcha house walls made of mud and roof shelter of weeds and wood. Per capita income of 71% families lies between 1000-2000 Pakistani rupees. In Nearly 88% families, single room was shared by 3-8 persons. Almost all families were using wood as a fuel for cooking in their houses and none of them reported to have air conditioner or humidifier or air filter in their homes. Acute respiratory infection in children of both villages was compared along with history of passive

smoking in their family (57% v/s 43%, p value .040). Immunization status of the children and Vitamin A supplement were similar in two villages. Immunization coverage of both village combine was about 88.3%. ARI cases were more in under-5 children sharing their bed room with 3 or more compared to those sharing with 1 or 2 people (80% v/s 20%, p value .011). Also cases were reported more in children of illiterate mothers as compared to literate (94.3% v/s 5.7%, p value <.033) ARI was more prevalent in children of joint families than nuclear families (80% v/s 20%, p value .019) and also in families using wood as cooking fuel than other household fuels like LPG

Most of the respondents (mothers) were aware that smoke is the major cause of Acute Respiratory infection in their under 5 children. Only small percentage of the respondents was of the opinion that cold, low birth weight and malnutrition can also cause ARI in their children.

Mother's responded as, "Majority of the health care providers say that ARI is mainly due to cold, infectious agents (germs), and low birth weight". Only 10% of the health care providers told them that the air pollution due to brick kilns is one of the main risks to their children particularly under the age of 5 years. Majority of the respondents were well aware of ill impacts of kilns and said that polluted air due to brick kilns can cause Respiratory diseases like acute respiratory infection and asthma, with few of the responded that smoky air can cause allergies in their children³⁸.

The findings of our study are very similar to study by (Joshi SK, Dudani I) regarding Environmental health effects of brick kilns in Kathmandu valley statistically significant high odds ratios for respiratory problems like tonsillitis (4.17 95% CI 2.05, 8.45) and acute pharyngitis (4.08 95% CI 2.01, 8.33) were observed among the students from Ganesh Public School located near to brick kilns as compared to children of Nabin English school located far away from brick kilns^{19,37,38}.

In study published in Indian journal of Community medicine by Nilanjan Kumar Mitra " Longitudinal Study on ARI Among Rural Under Fives" Overall incidence density rate of ARI episodes was 19.57 (C.I.- 15.60-24.57) /100 person-months at risk. Incidence was highest in infants (23.9/100 person-months), Risk ratios for smoking and per capita monthly income (<1000) was 2.15 and 3.19 respectively with significant p value <.05.

CONCLUSION

Our study revealed that, overall 24.5% under-5 children from village near to kiln industry and 12.8%

under-5 children from village far away from kiln industry developed acute respiratory infections. More than 65% of the children from both are aged between 12-59 months. Almost 90% of the mothers and 56% of fathers of the children from two villages were illiterate. There is combined family system in about three fourths households. Immunization status and Vitamin A coverage was about 88.3%. Wood was used as household fuel for cooking in almost 99% houses. None of the family was using air conditioner, humidifier or air filter in their house. Results from the present study may be useful to be used as base line for further studies and for making policy recommendation for the safety of children living near kiln industry.

RECOMMENDATIONS

- There is need of education of Health professionals, social workers, mothers to sensitize issue of air pollution due to brick kilns.
- Programs should be instigated to ensure that the local people, brick kiln owners, kiln workers and families living nearby are aware of the environmental and health impacts of the kilns.
- Similar provisions should be made that brick kilns should be constructed away from residential areas, schools and hospitals.
- Strong regulations need to be developed and implemented sincerely to make children environment safe.

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