Original Article

Economic Burden of Childhood Pneumonia in Abbottabad, Pakistan

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ABSTRACT

Objective: To estimate the cost per episode of childhood pneumonia in under-five children as well as both direct and indirect costs associated with the treatment of these infections.

Study Design: Cross sectional study

Place and Duration of Study: This study was conducted at the Department of Pathology, Shahina Jamil teaching hospital of Frontier Medical College, Abbottabad, Pakistan from July, 2014 and June, 2015.

Materials and Methods: Under-five children who were suffering from childhood pneumonia or suffered and treated for it in the past one month were included in the study. Their mothers/caretakers were the respondents. Data was obtained using a structured and pre-tested questionnaire.

Results: There were 229 respondents. Total median cost, direct non-medical cost and median direct medical cost associated with each episode of pneumonia was 300 PKR, 100 and 150 PKR, respectively. Non-medical expenses associated with treatment were low, 105 PKR. Direct medical expenses were 250 and 100 PKR in terms of medications and user fee at private health facility while at a public health facility, they were 100 and 03 PKR, respectively. It is evident that the expenses incurred in terms of fee and medicines were noticeably higher in private sector than in public sector. Indirect expenses were considerably higher amongst those patients who had visited a public health center as an out-patient. It was attributed to increased waiting time for medical consultation, 120 minutes, as compared to half hour at a private center. The indirect costs associated with hospitalized patients were non-significant. Many different methods were used to meet the health expenses related to treatment of ARIs in under-five children so as to produce extra funds. These methods included borrowing, allocation of fixed funds and selling personal goods or animals. Majority of the study participants (68.6%) had their monthly earnings amid 10,000-20,000 PKR.

Conclusion: The childhood pneumonia is associated with substantial economic burden. This must be considered while making health plans and strategies. This burden of disease could be attenuated by enhancing public sector medical services, curtailing treatment costs and introducing preventive strategies. The most significant preventive strategy will be to initiate influenza and pneumococcal immunization.

Key Words: childhood, pneumonia, economic, out of pocket expenses.

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INTRODUCTION

Childhood pneumonia is one of the leading causes of childhood mortality in developing nations. About 20% of deaths in under-five children are attributed to childhood pneumonia worldwide.[1] More than half of these cases of childhood acute respiratory tract infections (ARIs) happen in sub-Saharan Africa and south-Asia.[2] Childhood pneumonia was a main reason for repeated visits to a clinician and also put considerable financial load on health resources chiefly in developing nations where heath system is already inadequately funded.[1] About 40% visits to an out-patient pediatric department in Pakistan are due to symptoms of respiratory tract infection e.g. cold, cough etc.[3] ARIs are responsible considerable morbidity and mortality and meanwhile put substantial financial pressure on health care system because of increased usage of health resources and due to decreased productivity.[4]

Health financing is a fundamental component of an economic system of any country because it aids in imparting professional health services to its populace. Conversely, the conditions are sub-optimal in many developing nations. Many such countries like ours strive for adequate financing of their health system.[5] Public sector could not provide proficient and professional health services because of these financial restraints due to modest allocations. However, private health sector, which is believed to be of superior quality, efficient and competent by a number of people, price heavily for offering health services leading to hefty out of pocket expenses (OOP).[6] Non-responsive

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public health system, lack of faith and distrust in government hospitals, poor infrastructure, lack of trained medical personnel force public towards private health centers. All this collectively adds considerably towards treatment costs.[5,7] Hence, people are forced to use alternate ways .e.g. borrowing or selling their belongings to generate extra money so as to pay hefty medical and treatment expenses.[5] Similarly, these enormous medical costs prevent them from getting treatment of their sick child at an earlier stage which further leads to higher rates of complications and deaths whereas pneumonia-related mortality can be reduced by 50% by early diagnosis and treatment.[8]

In 2012, budgetary health allocations were only 0.27% of GDP in Pakistan.[9] These allocations were lowest as compared to all previous health allocations which in turn have pushed OOP further higher, upto 85%. When compared with other countries especially Eastern Mediterranean countries, these OOP costs were considerably higher.[5] Considering total health expenditures in Pakistan, the governmental contribution is only 25% while 72% is contributed by private health sector. The non-governmental and developing organizations contribute the rest of 3% expenses.[5] Increasing poverty along-with no functional health insurance system in place in our country, public is pressed towards catastrophic health expenses.[10]

There is not sufficient data in this area in our region. Therefore, we have performed this study in under-five children to ascertain the financial burden of childhood respiratory tract infections. The principle objective was to estimate the costs associated with each episode of childhood pneumonia and especially to determine direct medical, direct non-medical and indirect expenses associated with the childhood pneumonia.

MATERIALS AND METHODS

This cross-sectional study was conducted at Department of Pathology, Shahina Jamil teaching hospital of Frontier Medical College, Abbottabad,, from July, 2014 to June, 2015. Children who were suffering from ARI or who were ill and being treated for ARI in past month and less than five years of age were included in the study. On the other hand, those children who were suffering from chronic respiratory illness and were more than five years of age were excluded from this study. ARI was diagnosed by skilled clinician using European Center for Disease Prevention and Control's criteria.[4] There were 229 respondents with nil refusals. These were the mothers/caretakers of the children included in the study. Data was obtained using a structured and pre-tested questionnaire which took about 15-20 minutes to be filled. Respondents were particularly inquired about the cost of transport, drugs, diagnostic tests, consultation charges, mode of arranging money and any explicit financial allocations set aside for health purposes.

Direct expenses were sub-divided into direct medical costs, which were associated with medical treatment e.g. costs of medicines and diagnostic tests, consultation fee, etc, and direct non-medical costs, which were incurred on lodging, meals and travel (to health facility). Indirect medical expenses were estimated as the cost of absence from work. Expenses were estimated in Pakistani rupees (PKR).

Statistical package for social sciences (SPSS, version 21) was used to enter, organize and analyze data. Median was used for expressing expenses because the data was not normally distributed and the median was not affected by the extreme variations in data values.

RESULTS

The total number of respondents was 229. Total median cost, direct non-medical cost and median direct medical cost associated with each episode of pneumonia was 300 PKR, 100 and 150 PKR, respectively, as shown in Table 1.

Table No.1. Cost per episode of childhood pneumonia in PKR, (n=229)

Variable	Median	Minimum	Maximum	Interquartile range
Total cost	300	0	2700	108 - 683
Direct medical cost	150	0	950	50 - 300
Direct non-medical cost	100	0	400	50 - 150

Non-medical expenses associated with treatment were low, 105 PKR. This may be due to the fact that the estimation of non-medical costs excluded consultation fee as well as most of the medications were purchased directly from drug stores as over the counter drugs.

Table 2. Cost according to the health facility used in PKR, (n=229)

Variable	Median	Minimum	Maximum
Direct medical costs at private health facility			
User fee	100	0	200
Medicines	250	0	750
Direct medical costs at public health facility			
User fee	3	0	3
Medicines	100	0	250
Direct non-medical costs at public and private health facility			
Transportation	80	0	200
Lodging/meals	50	0	250

Direct **medical** expenses were 250 and 100 PKR in terms of medications and user fee at private health facility while at a public health facility, they were 100 and 03 PKR, respectively, as shown in Table 2. It is

evident that the expenses incurred in terms of fee and medicines were noticeably higher in private sector than in public sector.

Indirect expenses were considerably higher amongst those patients who had visited a public health center as an out-patient. It was attributed to increased waiting time for medical consultation, 120 minutes, as compared to half hour at a private center. The indirect costs associated with hospitalized patients were non-significant. This was because female caretakers or mothers attended their ailing child while the males visited them before or after work.

Various methods were employed to meet the health expenses related to treatment of ARIs in under-five children so as to produce extra funds. These methods included, i)- borrowing, ii)- allocation of fixed funds and, iii)- selling personal goods or animals, Table 3.

Table.3 Mode of arranging money for treatment of ARI, (n=229)

Mode	Number	Percentage
Borrowing	125	55%
Fixed savings for health	75	33%
Sale of material goods	22	10%
Sale of animals	7	2%
Total	229	100%

Majority of the study participants (68.6%) had their monthly earnings amid 10,000-20,000 PKR, Table 4.

Table No.4 Monthly income of the parents in PKR, (n=229).

Monthly income	Number	Percentage
<10000	37	16.2%
10000-20000	157	68.6%
21000-30000	29	12.6%
>30000	6	2.6%
Total	229	100%

DISCUSSION

Childhood pneumonia in under-five children put a lot of economic pressure, especially on an already over-burdened and inadequately funded public health system among developing nations. It causes significant utilization of public health resources which in turn leads to considerable out of pocket expenses in private sector. Under-privileged and disadvantaged poor people in developing countries have to bear this burden which contributes towards catastrophic health expense and push this populace into vicious circle of poverty. This causes hindrance in pursuing medical treatment at an earlier stage which contributes toward medical complications and childhood mortality. Furthermore, these people have to use extra means e.g. borrowing, savings or selling personal possessions or domestic animals to raise extra funds so as to meet hefty OOP expenses. [1, 5]

Total median cost, direct non-medical cost and median direct medical cost associated with each episode of pneumonia was 300 PKR, 100 and 150 PKR, respectively, in our study. This finding was similar to other studies. A study conducted by Rehman et al in slums of Islamabad has shown that the average cost of treatment associated with each pneumonia episode was 400 PKR.[5] Hussain et al have conducted their study in Northern areas of Pakistan. They also have reported that the total direct expenditures associated with each episode of childhood pneumonia were 456.19 PKR.[1] Similarly, according to Dongre et al, the average cost of treatment was 166.24 INR, (268 PKR), for each episode of respiratory tract infection in their Indian patients.[11]

Health expenses were quite high in private sector than in public sector in our study. They were mostly related to medications and fee. Same finding was reported by Dongre et al in their study which was conducted in India. As per their findings, health expenditures especially related to medications and fee were significantly higher for seeking treatment at a private health facility than at a public facility.[11] Likewise, Peasah et al have reported that the costs of treatment were twice as high at a private center than at a public center.[4] This has shown that the private health sector significantly contributes in hefty OOP costs because it's a very expensive treatment option.

Various methods were used to generate extra funds to bear hefty OOP costs. The chief mean was borrowing, (55%), usually from a friend or a neighbor. The other methods were fixed health savings per month, (33%), and selling of personal possessions or their animals, (12%). Similarly, Rehman et al have reported that the main methods of generating extra funds were borrowing (42%) and sale of material goods (23%) in their study.[5] Monthly income of majority of our study participants, 68.6%, was among 10,000-20,000 PKR. Likewise, the average monthly income of a household was 10,000 PKR according to Rehman et al and majority of their households, 72%, had their monthly earnings between 7,000 to 10,000 PKR.[5] On the other hand, according to Dongre et al the average monthly income of most of their subjects, 55.4%, was fewer than 1500 INR, (2500 PKR).[11] The difference in monthly earnings may be attributed to the study setting. Our study was performed in an urban area while that was of Rehman et al was carried out in slums of Islamabad, Pakistan while that of Dongre et al was conducted in a rural areas of India.

Childhood pneumonia is associated with hefty costs and OOP expenses. Enhancing public sector health services via improved funding and employing qualified and skilled workers, educating masses to increase awareness among them, introducing health insurance and preventive strategies like pneumococcal and influenza vaccination could be some of the important steps which can improve the outcome of these

respiratory infections in children and reduce OOP health expenses.[1, 4, 5]

CONCLUSION

The childhood pneumonia is associated with substantial economic burden. This must be considered while making health plans and strategies. This burden of disease could be attenuated by enhancing public sector medical services, curtailing treatment costs and introducing preventive strategies. The most significant preventive strategy will be to initiate influenza and pneumococcal immunization.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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