

Practical Approach to Lung Health – Experience from the Republic of Macedonia

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Abstract

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BACKGROUND: Among the adults and children aged 5 yrs who attend PHC settings, 20-30% seeks to care for respiratory symptoms. Over 80-90% of the respiratory patients suffer from acute respiratory infections (ARI), followed by chronic obstructive pulmonary diseases (COPD), asthma, and less frequently with pneumonia and tuberculosis (TB). To improve the quality of care in patients who seek assistance for respiratory symptoms in PHC settings and the efficiency of respiratory service delivery within healthcare systems, WHO has designated several initiatives among which one is PAL (Practical Approach to Lung Health). PAL is an integrated and symptom-based approach focused on all priority respiratory illnesses encountered in PHC, including TB. Its patient-centred syndromic approach aims to improve the quality of diagnosis and treatment of respiratory illnesses in a PHC setting.

AIM: To evaluate the short-term impact of PAL approach in improving the management of patients with the most frequent respiratory diseases by the GPs from PHC settings in the Republic of Macedonia.

MATERIAL AND METHODS: A total of 588 GPs were educated for the most frequent respiratory diseases during the PAL training from 2013-2016. To evaluate the efficiency of GPs education from PHC settings, GPs fill in a form out of 69 questions for the patients enrolled before (baseline survey) and after PAL training (impact survey), and the results of the two surveys were compared. This analysis aimed to assess if the theoretical and practical skills obtained during the PAL training have been used in the routine practice of the GPs who attended the training and to what degree.

RESULTS: Our results showed that in the impact study more patients with ARI ($P < 0.000001$) and more patients with COPD exacerbations were treated in the PHC settings ($P < 0.000008$). More patients suspected of asthma were referred to upper health level for diagnosis ($P < 0.037$). The comparison of the findings between the baseline and impact surveys suggest that training on PAL had an impact in decreasing drug prescription through a reduction in a prescription for antibiotics for ARI, COPD and asthma. Our study indicates that training on PAL is likely to increase the prescription of inhaled corticosteroids and tends to decrease the prescription of other formulation of these drugs ($P < 0.0000001$). The impact surveys showed that the patients with COPD and pneumonia in the PHC settings were better managed due to the more frequent use of CAT questionnaires and CURB test. And regarding TB cases, our study indicates that the GPs were more aware of this disease and were more willing to take part in the patient treatment follow-up ($P < 0.000001$).

CONCLUSION: The results from this study showed that implementation of PAL approach for GPs from the PHC setting in our country have positive results (effect) in the management of patients with respiratory symptoms: it is likely to reduce prescribing for antibiotics, to increase the use of inhalation medication which is highly recommended in the management of asthma and COPD, and to decrease the referral of patients with chronic diseases to the upper health level. However, more experience is needed for long-term influence on the effects over the cost-effectiveness of respiratory care services and on strengthening the health care system.

Introduction

Among the adults and children aged 5 yrs who attend PHC settings, 20-30% seeks to care for respiratory symptoms [1]. Underlying causes are wide-ranging, spanning from the common cold to pulmonary tumours and their frequencies of occurrence differ widely [2]. Over 80-90% of

respiratory patients suffer from acute respiratory infections (ARI), with a majority suffering from upper respiratory infections [3]. Among these respiratory infections, pneumonia and tuberculosis (TB) are usually infrequent (1-2%). Chronic respiratory diseases account chronic obstructive pulmonary disease (COPD), and asthma is encountered more often than TB and less frequently than ARI. However, worldwide asthma prevalence has been on the

increase in several settings during the past few decades [4]. The common point is that all respiratory diseases, if not diagnosed, treated and managed timely and correctly, are problematic for individuals and public health alike. In PHC settings, clinical symptoms presented by pulmonary TB patients are, in general, very similar to those symptoms displayed by non-tuberculous respiratory patients, particularly in those with persistent symptoms. Clinicians in primary health care (PHC) facilities, who are at the centre of all this, often feel challenged, as finding the right path in a vast jungle of similar respiratory symptoms can be a tedious and misleading endeavour. The complex path constitutes making the correct diagnostic, treatment and management choices for all respiratory patients [5].

The World Health Organization (WHO) estimates that approximately 50% of people with TB are never diagnosed as having the disease and so cannot benefit from treatment, leaving the epidemic unchecked despite increasing global coverage by treatment programs [6]. Improved passive case detection is fundamental for the control of the TB epidemic and depends on alert clinicians identifying TB in patients seeking primary care for respiratory symptoms. To remedy this challenging situation, the Stop TB Department of WHO has designated several initiatives to improve global TB control, among which one is PAL (Practical Approach to Lung Health), which was initiated in 1998. PAL is an integrated and symptom-based approach focusing on all priority respiratory illnesses encountered in PHC, including TB. PAL tries to shine a guiding light in the vast respiratory jungle. Its patient-centered syndromic approach aims to improve the quality of diagnosis and treatment of respiratory illnesses in a PHC setting. It seeks to standardise service delivery through development and implementation of clinical guidelines and managerial support within district health system. It is intended to coordinate among different levels of health care and between tuberculosis (TB) control and general health service [5].

PAL has the following specific goals: 1) to improve the quality of management of patients with respiratory symptoms in the setting of PHC. 2) To improve the efficiency of the delivery of respiratory services within the overall health care system, with a focus on coordination and integration of respiratory case management within the district health care system of low-and-middle-income countries, particularly those with already successful TB control programs or a high prevalence of HIV infection [5]. PAL is aimed at improving the management of major respiratory disorders, and in the process increases the identification of TB patients among all those with compatible symptoms who seek care in PHC settings [6] [7] [8].

In October 2013, the national tuberculosis program (NTP) of the Republic of Macedonia initiated the process of PAL approach for PHC settings as part

of the activities from the Global Fund Project for HIV/AIDS, malaria and TB. PAL project was conducted with the aim to educate the general practitioners (GPs) from PHC settings how to improve the quality of care in patients who seek assistance for respiratory symptoms in PHC settings and the efficiency of respiratory service delivery within health care systems, focusing on the district health. PAL concentrates on the most prevalent respiratory diseases at first-level health facilities-pneumonia, acute bronchitis and other acute respiratory infections, TB, chronic respiratory conditions including chronic bronchitis, asthma and COPD.

It aims at improving the identification and management of TB concerning the other respiratory illnesses, as well as the identification and management of non-tuberculous respiratory conditions concerning TB. It also aims to improve coordination between the different components and programs of the health care system, including the National TB Program, as many components are involved in the management of patients with respiratory symptoms [6].

The study aimed to evaluate the short-term impact of PAL approach in improving the management of patients with the most frequent respiratory diseases by the GPs from PHC settings in the Republic of Macedonia.

Material and Methods

PAL implementation followed 9 standardized steps: 1) enlist the national working group (NWG) who will support the PAL strategy; 2) estimate the burden of respiratory diseases; 3) assess the capabilities of the health infrastructure in implementing the PAL strategy; 4) develop clinical guidelines; 5) formulate an information system to monitor and evaluate the implementation; 6) develop training materials; 7) test the implementation of the clinical guidelines and the information system in a pilot area; 8) develop a national implementation plan; and 9) organize systematic supervision and evaluation of the PAL strategy.

The NWG for PAL implementation has worked within the National TB Program in collaboration with the Ministry of Health. Training material was developed by the NWG, and the implementation was targeted with appropriate utilisation of PAL guidelines by the health care workers in their daily tasks. At the PHC level, respiratory patients have been managed by their symptoms, but this is not carried out in a systematic and standardised manner [11]. So, it was very important to prepare guidelines adapted for primary care. The guidelines were designed to improve the

case management of respiratory diseases at PHC outpatient services and first referral hospitals. Guidelines took into account the context of the country, the health policy and the existing national guidelines. They have also to be evidence-based. Healthcare providers use the guidelines to perform step-by-step patient evaluations, to determine the specification of the most suitable form for disease management. It was decided to provide all GPs from PHC settings with peak flow meters.

The first phase of PAL education started at the end of 2013 and engaged 84 GPs from PHC settings. In the second phase, PAL education was enhanced to nearly the whole territory of the country, and the total number of 588 GPs was engaged until the end of 2016. PAL educations were organised as workshops within two days. The maximum number of the participants was 30 divided into two working groups.

Any patients aged 5+ years that sought care for at least 1 respiratory symptom in any of the selected PHC settings during the study period were eligible to be enrolled in the surveys. The GPs enrolled in the study registered specific information on every enrolled patient in a registry form. To evaluate the efficiency of GPs education from PHC settings, GPs filled in a form out of 69 questions for the patients enrolled before (baseline survey) and after PAL training (impact survey), and the results of the two surveys were compared. Both surveys were carried out in the same season and the same PHC settings and involved the same GPs. This analysis included the number of examined patients, especially those with respiratory symptoms as well as the manner the GPs treated them and how many patients were suspected for TB and were admitted to the higher level, then the subscribed therapy for the patients, particularly the number of antibiotics and inhalation therapy. The analyzed period in the baseline survey was one month before the educational training and the period in the impact survey was one month after the educational training. This analysis aimed to assess if the theoretical and practical skills obtained during the PAL training have been applied in the routine practice of the GPs who attended the trainings and to what degree.

Chi-squared test was used to for comparison of the proportions between the data in the baseline and impact study. A statistical difference was considered significant when the p-value was < 0.05.

Results

Among the total number of 80746 patients who admitted to the PHC settings due to different symptoms before the PAL education, 21 762 or 26.9%

were patients who sought care for respiratory symptoms. One month after the PAL education, 84 449 patients visited PHC settings, and 24 152 or 28.6 % sought care for respiratory symptoms. So the baseline survey registered 21 762 patients and the impact survey 24 152 patients with respiratory symptoms (Table 1).

Table1: Total number and % of patients admitted to the PHC settings and patients with respiratory symptoms

Patients admitted to PHC settings	Baseline survey		Impact survey	
	Amount	%	Amount	%
Total patients	80 746	100	84 449	100
Total patients with respiratory symptoms	21 762	26.9	24 152	28.6

Among the patients with respiratory symptoms in the PHC settings, the most frequent were patients with ARI-72%, then the patients with COPD, asthma, pneumonia and TB. The patients with different respiratory diseases had very similar distribution before and after PAL education (Table 2).

Table 2: Distribution of patients with different respiratory diseases

Respiratory diseases	Baseline survey		Impact survey	
	Amount	%	Amount	%
ARI	15647	72.0	17075	70.6
COPD	3916	17.9	4257	17.6
Asthma	1721	7.9	2077	8.6
Pneumonia	435	2.0	531	2.2
TB	43	0.2	212	0.9
Total	21762	100	24152	100

In Table 3 were showed that more patients with ARI were treated in the PHC setting in the impact than in the baseline survey and it was statistically significant ($P < 0.000001$). Regarding the prescribed antibiotics, in the impact survey, a smaller number of patients (46%) received antibiotics in comparison with the baseline survey.

Table 3: Management of patients with ARI

	Baseline survey		Impact survey	
	Amount	%	Amount	%
Treated in PHC settings	12703	81.2	16682	97.7
Referral to the upper health level	2944	18.8	393	2.3
Total	15647	100	17075	100
Statistical significant $P < 0.000001$				
Prescribed antibiotics	8590	54.9	7854	46.0

The results showed that statistically significantly smaller number of patients with exacerbation of COPD was referred to the upper health level in the impact survey ($P < 0.000008$) (Table 4). There was a decrease in the number of prescribed antibiotics for COPD patients in the impact survey. Another positive result was that the CAT questionnaire (for the assessment of the patient's symptoms) was used more frequently (18.1%) from the GPs in the PHC settings in the impact survey than in the baseline (13.2%).

Table 4: Management of patients with COPD

	Baseline survey		Impact survey	
	Amount	%	Amount	%
Treated in PHC settings	2910	74.3	3342	78.5
Referral to the upper health level because of exacerbation	1006	25.7	915	21.5
Total	3916	100	4257	100
Statistical significant				$P < 0.000008$
Prescribed antibiotics	2102	53.7	1230	28.9
Referral to the upper health level for diagnosis	3739	95.5	2132	50.1

Regarding the patients with asthma, there were statistically significant differences in the number of patients treated in the PHC settings and the referral to the upper health level (Table 5) in the baseline and impact surveys. It was obvious that more patients for diagnosis were referred to the upper health level after the PAL training.

Table 5: Management of patients with asthma

	Baseline survey		Impact survey	
	Amount	%	Amount	%
Referral to the upper health level for treatment	235	13.7	334	16.1
Treated in PHC settings	1486	86.3	1743	83.8
Total	1721	100	2077	100
Statistical significant				$P < 0.037$
Referral to the upper health level for diagnosis	270	15.7	615	29.7

Regarding the prescribed therapy for the patients with asthma, in the baseline survey inhaled corticosteroids (CS), oral CS and antibiotics were prescribed in 70.9%, 11.6% and 20.5 % of patients, and in the impact study in 75.8%, 9.1% and 17.4% separately. It was statistically significant that the GPs prescribed more inhaled that oral CS, and fewer antibiotics in the impact survey (Table 6). Also, more clinicians use to measured peak expiratory flow (PEF) for monitoring the patients with asthma after PAL education (47.2%) in comparison with the period before PAL education (21.6%).

Table 6: Prescribed therapy for the patients with asthma

	Baseline survey		Impact survey	
	Amount	%	Amount	%
Prescribed inhaled CS	1220	70.9	1574	75.8
Prescribed oral CS	199	11.6	189	9.1
Prescribed antibiotics	352	20.5	361	17.4
Pef	371	21.6	980	47.2
Total	1721	100	2077	100
Statistical significant				$P < 0.0000001$

There were no statistically significant differences in the treatment of patients with pneumonia before and after PAL education. But it is obvious that GPs used the CURB test most frequently for assessment of the degree of severity of pneumonia and the appropriate management of patients (Table 7).

Table 7: Management of patients with pneumonia

	Baseline survey		Impact survey	
	Amount	%	Amount	%
Referral to the upper health level for treatment	61	13.8	72	13.6
Treated in PHC settings	374	86.2	459	86.4
Total	435	100	531	100
Statistical significant				$P = 0.83$
CURB test	97	22.4	199	37.6

The number of TB cases in the PHC setting was very low: among the total number of patients with respiratory diseases, there were only 21 and 24 suspect cases for TB (0.1%), in the baseline and the impact survey. It is important to notice that in Macedonia, diagnosis, treatment and follow-up of TB cases are in the responsibility of the clinicians from dispensaries and hospitals for lung diseases and TB and the GPs from the PHC settings are in very small proportion included in the management of these patients. But with the PAL approach, there were a statistically significantly bigger number of TB cases for whom GPs from PHC settings were aware and had followed their treatment during the continuous phase of the treatment regime. In the impact survey, there were 43 patients with diagnosing for TB and in the baseline survey 212. GPs in the PHC setting were aware for the adverse reactions due to the TB drugs in 7.1 before and 12.5 % out of the TB cases after the PAL education (Table 8) ($P < 0.000001$).

Table 8: Management of patients with tuberculosis

	Baseline survey		Impact survey	
	Amount	%	Amount	%
Suspect for TB	21	0.1	24	0.1
TB cases	43	0.2	212	0.9
Adverse reaction of TB drugs	3	7.1	26	12.5
				$P < 0.000001$

Discussion

The Practical Approach to Lung Health (PAL) is one of the strategies intended to overcome the challenge posed by weak health systems. This initiative is aimed at managing respiratory patients in primary health care settings while expanding TB detection and good-quality of TB services. Thus, it provides clear orientation on the coordination of healthcare between different levels and within relevant structures of general health services, incorporating well-defined country adapted criteria for patient referral.

To meet the requirements established by WHO for PAL testing in this work the same study protocol was used both, in the baseline and impact surveys [7]. Both surveys took place in the same seasons, in the same PHC settings and with the same GPs to ensure comparability between the data sets of the 2 surveys. As the 588 GPs were the same in both surveys, it is expected that the changes in their work with respiratory patients are due to the PAL education.

Our results showed that in the impact study more patients with ARI ($P < 0.000001$) and more patients with COPD exacerbations were treated in the PHC settings ($P < 0.000008$). More patients suspected of asthma were referred to upper health level for diagnosis ($P < 0.037$). The comparison of the findings between the baseline and impact surveys

suggest that training on PAL had an impact in decreasing drug prescription through a reduction in a prescription for antibiotics for ARI, COPD and asthma. Our study indicates that training on PAL is likely to increase the prescription of inhaled corticosteroids and tends to decrease the prescription of other formulation of these drugs ($P < 0.0000001$). The impact surveys showed that the patients with COPD and pneumonia in the PHC settings were better managed due to the more frequent use of CAT questionnaires and the CURB test. And regarding TB cases, our study indicates that the GPs were more aware of this disease and were more willing to take part in the patient treatment follow-up ($P < 0.000001$).

Similar results were reported in other countries where PAL methods have been initiated. The proportion of diagnosed cases with chronic respiratory diseases increased in the Jordan impact study [9]. In the same way, asthma diagnosis increased in Algeria after the PAL training (15.3% versus 10.3%) [10], whereas in Syria, the proportion of patients with asthma remained at 4.5% in both surveys, contrasting with the increase in COPD diagnosis (1.5% versus 0.7%) [11]. In Kyrgyzstan, significant achievements were reported within the PAL implementation period as mortality rates from respiratory diseases were reduced by 23% [12].

The implementation of PAL guidelines promotes rational use of drugs for respiratory diseases [13]. Inappropriate reliance upon antibiotics and underuse of inhaled corticosteroids in asthma are very frequent in PHC facilities [14]. Overuse of antibiotics due to underdiagnoses and misdiagnosis of respiratory conditions is a major concern [14]. Preventing and managing antimicrobial resistance is imperative as the presence of multidrug-resistant organisms has generated substantial apprehension among clinicians and public health experts [15]. In Nepal, the implementation of PAL guidelines implementation resulted in a reduction in multiple drug prescription and increased the prescription of generic drugs, as well as prescriptions from the essential drug list [16]. Use of PAL guidelines increased TB suspicion and TB detection in the majority of the countries [10] [11] [14]. Detection was improved whatever the country prevalence of TB was. The advantages were not only increased in the sputum smear-positive case TB detection, but also in increased detection of extrapulmonary TB [10]. Results from some study showed improvement in the quality of care for TB patients, and improvement of the successful treatment completion rates among TB retreatment cases [17]. In Kyrgyzstan, however, no improvement was observed concerning TB [3].

GPs in the PHC setting have the following advantages from the PAL implementation: to correctly interpret the key signs and symptoms; assess diagnosis; determine the degree of severity (e.g. in asthma patients); suggest adequate treatment; and, if necessary, identify referral options.

It is expected that long-term application of PAL will further underscore possible PAL impacts. The improved integration of respiratory care is expected to increase the proportion of respiratory patients managed in PHC and to decrease the proportion of hospitalised cases. Improved diagnostic quality of pulmonary TB among respiratory patients and reduced cost of respiratory case management are also among the long-term advantages that PAL will ensure.

The results from this study showed that the implementation of the PAL approach for GPs from the PHC setting in our country had had a positive effect in the management of a patient with respiratory symptoms. The findings suggest that implementation of PAL approach in the PAL settings is likely to reduce the prescribing of antibiotics, to increase the use of inhalation medication which is highly recommended in the management of asthma and COPD, and to decrease the referral of patients with chronic diseases to the upper health level. The PAL approach identified syndromes using symptoms and signs that best predict each disease. These results are in line with the findings of studies on PAL carried out in other country settings. However, more experience is needed for long-term influence on the effects on cost-effectiveness over the respiratory care services and over strengthening the healthcare system.

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