Current Use of Antibiotics among Vietnamese People in the First Level of Healthcare System in Nam Dinh Province

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Abstract In Vietnam, the national public healthcare services and statistics reveal problems with antibiotic use in the community with misunderstandings leading to the irrational and inappropriate use of these drugs resulting in bacterial resistance together with its consequences. There have been studies in Vietnam revealing a major problem in prescribing in the acute sector, but most antibiotics are prescribed in the community and there had been no studies exploring the situation in the community. This study was therefore an evaluation of the knowledge, skills and prescribing practice of those primarily responsible for administering antibiotics in the community, and was the first of its kind in Vietnam. The study used method triangulation to evaluate antibiotic use in the study location, a district in one province in North Vietnam. The district was chosen as it was typical of other rural areas in North Vietnam. The findings revealed a very high rate of antibiotic administration (79.8%) of which more than half (54%) were incorrectly prescribed for non-infectious conditions. Also, misunderstandings, limited knowledge and perceptions regarding the use of antibiotics, with staff having had little post basic training and education. It is further recommended that similar studies will be conducted along this line to verify the findings of the study.

Keywords: *antibiotic, use and misuse, commune level, health workers, prescribing*

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1. Introduction

This study described in this paper was based in Vietnam, a tropical country located in the Center of the Southeast Asian Region where infectious diseases are common and usage of antibiotics has become inevitable. Now regarded as an emerging economy, with a population of over 86 million, Vietnam still has many of the problems of other developing countries, not least of which is the misuse of antibiotics. The resulting increasing resistance, caused in part by misadministration, is compromising the health of the community. There have been several programs designed to reduce misuse, but these have all focused on the acute, or hospital settings. Therefore, this project is unique as the first study to address these problems within the rural settings within which 70% of the population still reside. The aim of the study was to evaluate the use or misuse of antibiotics in the community.

The Report on Infectious Diseases of World Health Organization [1] pointed out that within the developing world, 50% of antibiotics usage was inappropriate a statement that still reflects the situation in Vietnam today

[2]. Antibiotics can be purchased with or without a prescription, and in many instances without any patient education. In 2000, only 20% of people who use antibiotics did so via a prescription, in more than 80% of cases they were bought and used without prescription guidelines [3], a situation that continues today. Many people using antibiotics do not understand the need to complete courses, and keep tablets to use when they think they 'need' them [4]. Commune health centers which provide a range of services are the first level of health care provision. Although a lack of workers means that coverage is incomplete in some communes, the health workers include medical/assistant doctors, pharmacists, nurses and midwives. Most of these healthcare workers have the responsibility for the use and administration of medicines in general and of antibiotics in particular. However, the majority are only educated to secondary level (two-year training), with some only having undergone an elementary program (one-year training or less). Although provided by colleges and/or medical schools, these courses are far from academic, providing a practical knowledge transfer training, where the focus is learning by rote, rather than critical thinking or problem solving.

Before the 1980s, when Vietnam had a subsidized economy, lack of essential drugs was a pressing concern

for the nation [5]. According to SIDA [6] during this period yearly expenditure on medication accounted for only 0.5 USD per person. Since the "mo cua" (open door) and "doi moi" (renovation) policies together with the rapid changes in the economy, the pharmacy market has rapidly expanded with more and more private pharmacies and private practitioners. The consumption of antibiotics has increased annually; with antibiotics now accounting for 40-50% of the foreign medication imports, with USD $1,400 million being spend annually [7]. This may be in part because by 2006, the findings of the Antibiotic Susceptibility Test Surveillance indicated that most common infectious pathogens, Klebsiella ssp, Escherichia coli, Acinetobacter ssp, Pseudomonas aeruginosa and Staphylococcus aureus, were all multi-resistant to commonly used antimicrobial agents [8]. The consequences of such antibiotic resistance have become an international problem [9] with increased morbidity and mortality and the general population exposed to the risk of contracting a resistant strain of infection [10].

The Ministry of Health (MOH), Vietnam [11] recognizes that unsafe, inappropriateness and ineffectiveness of drug usage has serious consequences in many areas including public health, patterns of diseases, waste of the national budget, and increased antimicrobial resistance. Although the sale of antibiotics occurs across Vietnam, legally they should not be sold without a prescription; the reality indicates clearly a failure to enforce present regulations [12]. In addition to these problems there is concern that the knowledge of physicians, pharmacists and patients are all insufficient. Drug information for prescribing comes mainly from advertisements and leaflets. Such sources of information have limitations including insufficient scientific facts, vagueness regarding side effects and noncompliance with agreed standards of ethics. Research found that about 90% of pharmaceutical representatives had never been aware of ethical standards in their activities and advertisements of medicines intended for the public were especially unclear about contraindications and adverse reactions [13]. Although information from the above sources is insufficient, prescribers receive almost no official information from MOH and medical universities

Bacterial resistance can be defined genotypically, which means the bacteria carry certain resistance elements, phenotypically, that is to say the bacteria can survive and grow above a certain level of antibiotic in the laboratory, or clinically, that is namely the bacteria are able to multiply in humans in the presence of drug concentrations achieved during therapy [14]. Bacterial clones with natural and acquired resistance have constantly been seen as an evolutionary response to the use of antibiotics.Looking back to the process of the production and use of antibiotics, it is clear that there is a clear circle of antibiotic development and resistance. First seen with Penicillin, discovered in 1927 but not freely available until 1944, the first penicillin-resistant Staphylococcus aureus (PRSA) were found in 1945 and that advanced to 25% resistance by 1949, and 50% by 1959. This was followed by the release of methicillin which was active against PRSA, but in turn resistance against this medication developed [15]. This cycle of release of a new drug, the development of resistant bacteria and the consequent need for new drugs continues, with bacterial infections becoming increasingly harder to treat [16].

The use of antibiotics triggers a combination of genetic and biochemical mechanisms within the bacteria to secure their survival [17]. The successive introduction of new antibiotics has itself catalyzed the accumulation of resistance mechanisms that travel between microbes, creating clones with multi-resistant properties [18]. One of the major mechanisms is that bacterial clones with natural and acquired resistance have continuously been developing as an evolutionary response to the use of antibiotics. The other major mechanism is horizontal gene transfer between bacteria both within and between species [19]. The genetic alterations in bacteria cause resistance to antibiotics in one or more of four principle ways: the target molecules of micro bacteria are structurally altered to prevent antibiotic binding; antibiotics are excluded from cell entry; inactivated by degrading enzyme; or pumped out of the cell. With this, study aims to evaluate the current using of antibiotics in the community in one district in Nam Dinh Province, Vietnam.

2. Objectives of the Study

The study determined the current using of antibiotics in the community in one district in Nam Dinh Province, Vietnam. Specifically, the study assessed the extent of antibiotic use and misuse in Myloc District, Nam Dinh Province Vietnam; reviewed the current education and training of public health workers regarding antibiotic use and misuse; and identified the factors that influence antibiotic use in Myloc District, Nam Dinh Province Vietnam.

3. Materials and Methods

To gain the full data as baseline establishment, a triangulation research approach was employed. Therefore, this study consisted of three interlinked investigations, a survey by questionnaire, documentary data analysis and focus groups. The first; was the quantitative data set from the survey, this focused on knowledge levels, the second; was data extracted from patient documentation and focused on prescribing patterns and practices. The third investigation used focus groups to illustrate and further interpret the quantitative data sets from the first two investigations.

Vietnam is divided into series of provinces subdivided into districts then communities providing health services within areas that correspond to the government administrative structure [20]. Healthcare services offered in the health communities is mainly provided by assistant doctors, nurses and other carers with lower levels of training.

Purposive sampling was used to identify the district in which the study was based. This non-random method of sampling aims to sample a group of people, or settings, with a particular characteristic [21] and was seen as the most appropriate method drawing on the participants' experience of the phenomena under study to produce meaningful data [22]. The district in Nam Dinh Province was selected with official approval as it has features of geography, demography and a public health system that are representative of other rural areas, as health structures in Vietnam are dictated by government policy, with standard processes and staffing. Within the district selected, a total

sample was used which included all health workers of all levels of education working full-time at all community health centers in one district (56 CHWs).

In contrast to the survey for the patient documentation, it was not feasible to sample all 41,847. Therefore, the number of patient records sampled was calculated using the formula below [23].

$$N = \frac{z^2_{1-a/2}P(1-P)N}{d^2(N-1)+z^2_{1-a/2}P(1-P)}$$

Using this equation, the number of prescriptions selected in this study was 1,047.

For the survey by questionnaire, a self-completion format was used, which consisted of a detailed questionnaire with both closed and open questions. The closed questions were coded and analysed using descriptive statistics. The choice was made to use descriptive statistical analysis rather than inferential test, as the aim was to record and describe the baseline measures not to make inferences. The open-ended questions were coded using a specifically designed coding manual and then descriptively analysed [23].

For the patient records, a tabular format was developed to record the categories of data, these included the extent of antibiotic usage overall, commonly used types, disease trends, patient data were quantitatively analysed. The criteria used for evaluation of prescriptions and categories regarding antibiotics and antibiotic prescribing were based on guides from the official publications of Vietnam including Vietnamese National Drug Formulary (and Guide to Treatment Common Bacterial Infection Diseases [25].

In total, 11 focus groups were conducted, one in each of the 11 CHCs. These were the same participants who completed the questionnaires. Data collection and analysis was based on a modified grounded theory approach. It was seen as modified as only once cycle was completed, but there was evidence of saturation as the focus groups were completed. Data analysis began as soon as the first focus group was completed, and used four steps. *(1) Exploration, (2) Specification phase, (3) Reduction phase* and *(4) Integration phase*. In the first step key points from transcripts were identified and gathered. In the second step similar contents were given a code then collections of codes were made that allowed the data to be grouped. In the third step broad groups of similar concepts were shaped that were used to generate a theme, then a collection of explanations that explain the theme was expressed in the fourth step.

Approval for the study was gained from the MOH and the Provincial Department of Health, who accepted that no individual would be identified within the study. The researcher had contact with the potential participants prior to the study, they were clearly informed about the goals of the study and that all information was to be securely stored and anonymised.

4. Results and Discussion

There were 56 participants with 58.9% female reflect the situation found in health care across Vietnam (Table 1) A wealth of information was gained from the survey as evident by the education and training presented below.

Table 1. Demographics of Health Workers in CHCs

Category			Health Workers	
			n	%
Education Level	University	Total	6	10.7	
		Medical Doctor		6	10.7
	Secondary	Total	30	53.6	
		Assistant Doctor		17	30.4
		Nurse		9	16.1
		Midwife		4	7.1
	Elementary	Total	20	35.7	
		Nurse		8	14.3
		Midwife		6	10.7
		Pharmacist		6	10.7
Length of Service		Min	1		
		Max	38		
		1-5 years		10	17.0
		6-15 yras		16	28.6
		16-25 years		24	42.9
		>25 years		6	10.7
Further Training	Never attended any course in total		19		33.9
	Attended at least one course in total		37		66.1
	Attendance public health courses				
	Total		29	51.8	
	Health care for children		5		8.9
	Reproductive health care		5		8.9
	Prevention & control for diseases and epidemic		14		25.0
	Health education and communication		4		7.1
	Medical technology		1		1.8
	Attendance on pharmaceutical courses				
	Total		18	32.1	
	Medicine use		5		8.9
	Medicine management, ordering and storage		10		17.8
	Attended but forgot tilt/content of course		3		5.4

Table 2. Health Workers' Perception and Understanding of Antibiotics

Question and Answers	% of Responses (N =56)
Based on your own understanding, please answer what antibiotics are	
1. medicines used to kill and inhibit bacteria	16.1
2. medicine used to kill bacteria	21.4
3. medicine used to inhibit bacteria	5.4
4. medicine used to treat infection	41.4
5. medicine used to treat inflammation	5.4
6. incorrect answer	10.6
What happens if the patient does not complete the course	
1. make bacteria resistant to antibiotics	73.2
2. others	26.8
What are the results of self-medication	
1. disease in not cured	42.8
2. may suffer from adverse effects	23.2
3. makes it difficult to diagnosis and treat	28.6
4. incorrect answer	3.6
5. no response	1.8
What is your concept of misuse of antibiotics	
1. used without manifestation of bacterial infection	32.1
2. incorrect type and/or dosage of antibiotics given	23.2
3. both 1 and 2	17.9
4. incorrect answer	25
5. no response	1.8
What are the consequences of antibiotic misuse	
1. poor effect of treatment	17.9
2. make a bacteria resistant to antibiotics	25.0
3. both 1 and 2	44.6
4. other consequences (waste, dangerous)	10.7
5. incorrect answer	1.8

Table 3. Health Workers' Practical Experience of Antibiotics

Question and Answers	% of Res-ponses (N=56)
What were the symptoms and/or manifestations that you based on to give patients antibiotics	
1. fever & clinical manifestations related to bacterial infection	41.1
2. fever & clinical manifestations related to a bacterial infection	30.4
3. clinical manifestations unrelated to a bacterial infection	7.1
4. only fever	3.6
5. incorrect answer	17.8
When you decide on giving clients antibiotics, the class of antibiotics chosen will be	
1. based on specific disease/infection	42.8
2. based on contraindications	21.4
3. based on both 1 and 2	16.1
4. based on indications of antibiotics	7.1
5. based on experimental therapy	3.6
6. based on common antibiotics available at commune level	3.6
7. incorrect answer	5.4
When you decide on giving clients antibiotics, the dose of antibiotics indicated will be based on	
1. based on severe level of disease/infection	37.5
2. based on physical status of patients	3.6
3. based on both 1 and 2	44.6
4. based on recommended dosage	14.3
A course of antibiotics at least needs to be used to cure a patient is	
3 days	5.4
5 days	50.0
7 days	42.8
10 days	1.8
Sources of information and knowledge for health workers base on to prescribe and administer medicines were	
1. from original training	91.1
2. from post qualifying training courses	28.6
3. from guideline books/documents	75.0
4. from leaflets/box coves	73.2
5. from colleagues	33.9
6. combination of sources	7.1

Of the 56 respondents 30.4% replied that fever and other clinical manifestations unrelated to a bacterial infection were the bases on to give patients' antibiotic.

Table 4. Comments from Health Workers Regarding Antibiotics Use

Categories and Subcategories		Respondents	
		n	%
Difficulties in making decisions on giving antibiotics	non-compliance from locals	9	16.1
	knowledge of prescribing	22	39.3
	lack of facilities	16	28.6
	no difficulty	7	12.5
	inappropriate answer	1	1.8
	no response	1	1.8
Further comments	abuse of antibiotics exists	8	14.3
	antibiotic resistance exists	3	5.4
	re-training is needed	11	19.6
	misconceptions exist	1	1.8
	no response	33	58.9

Table 5. Age Groups and Gender of the Studied Sample

Age Group	Gender				Total	
	Male		Female			
	N	%	n	%	n	%
= 1 year	16	1.5	19	1.8	335	3.3
2-6 years	86	8.2	85	8.1	171	16.3
7-12 years	20	1.9	20	1.9	40	3.8
13-60 years	216	20.6	206	19.7	422	40.3
=60 years	172	16.4	207	19.8	379	36.2
Total	510	48.7	537	51.3	1047	100.0

Table 6. Diseases and Percentages of Antibiotics Prescribed

Disease/ Conditions	Attendance		Treated		
	n	%	n	With antibiotic	%
1. acute inflamed ENT	217	20.7	213	213	100.0
2. arthritis	82	7.8	67	39	58.2
3. acute bronchitis	79	7.5	78	78	100.0
4. oesophagus/stomach pain	58	5.5	53	50	94.3
5. dental caries, gingivitis	55	5.3	51	49	96.1
6. pain of nerves	49	4.7	44	2	4.5
7. vestibular disorder, headache	49	4.7	47	3	6.4
8. acute conjunctivitis/red sore eyes	46	4.4	45	42	93.3
9. pneumonia	44	4.2	39	39	100.0
10. acute respiratory infections	34	3.2	34	34	100.0
11. rash/itchy skin conditions	34	3.2	32	16	50.0
12. flu/cold	29	2.8	29	13	44.8
13. acute tonsillitis	28	2.7	28	28	100.0
14. chronic bronchitis	28	2.7	28	28	100.0
15. wound by accidents	26	2.5	25	24	96.0
16. colitis/enteritis	24	2.3	22	21	95.5
17. acnes/boils/swelling	20	1.9	19	19	100.0
18. hypertension	20	1.9	20	4	30.0
19. malnutrition, asthenic	15	1.4	14	0	0.0
20. tumours, lymph nodes	14	1.3	9	9	100.0
21. trachoma, eye conditions	13	1.2	10	8	80.0
22. bronchial asthma, allergy	12	1.1	11	10	90.9
23. diarrhoea	11	1.1	9	6	66.7
24. surinfected skin inflammation	11	1.1	9	9	100.0
25. acute dysentery	9	0.9	9	9	100.0
26. urinary/genital infection	9	0.9	6	6	100.0
27. inflammation/kidney/gall stones	7	0.7	6	6	100.0
28. tuberculosis	5	0.5	0	0	0.0
29. glomerulonephritis	3	0.3	0	0	0.0
30. epilepsy	2	0.2	0	0	0.0
31. gastric/duodenal ulcers	2	0.2	1	1	100.0
32. mental disorders	2	0.2	2	1	50.0
33. diabetes mellitus	2	0.2	0	0	0.0
34. cancers	2	0.2	1	0	0.0
35. chronic hepatitis	2	0.2	0	0	0.0
36. helminthic conditions	1	0.1	1	1	100.0
37. cerebral stroke	1	0.1	0	0	0.0
38. acute viral hepatitis	1	0.1	1	1	100.0
39. chronic insomnia	1	0.1	1	0	0.0
Total	1047	100.0	964	769	79.8

Table 7. Extent of Antibiotics Prescribing by Conditions

Diseases/Conditions	Prescriptions				Total	
	Without antibiotics		for/with antibiotics			
	n	%	n	%	n	%
Infectious	22	3.8	566	96.2	588	100.0
	11.3		73.6		61.0	
Non-infectious	173	46.0	203	54.0	376	100.0
	88.7		26.4		39.0	
Total	**195**	**20. 2**	**769**	**79.8**		**100.0**
	100.0		**100.0**		**100.0**	

In total, using the formula given in methods section, 1,047 prescriptions were randomly selected from the total 41,847 prescriptions available. The age groups and gender of patients who came and received medical examination and treatment at CHCs are given in Table 5. Table 6 gives a general picture of the wide range of cited diseases and the overall level prescribing of antibiotics. To date in Vietnam there has been no official publication regarding the percentage of antibiotics used at community level, but this survey shows that there is a very high percentage of antibiotic (79.8% in overall) administration, with

antibiotics seen as the drug of choice for almost all diseases or conditions, regardless of whether they are appropriate. An indication of the scale of this problem the fact that 54% of the total non-infectious conditions were given antibiotics (Table 7). There was also evidence of inadequate diagnoses, with records containing only a general description such as red or itchy skin. Few indicated whether patient education had been given, and for those attending with repeat problems there was no evidence of assessment of compliance with dosages and duration of treatment. Another major concern was the calculation of dosage, in some instances, there appeared to be limited scientific rationale for the doses and duration of treatment prescribed.

The five final themes in order of presentation, were, antibiotic use, peer and community pressure, lack of facilities, multiple roles with limited competence and health insurance as motivation. These are recapped in the following (Table 8).

The evaluation gave a detailed picture in which health workers at the community level are assigned the main responsibility for providing healthcare services for their local population including most work regarding administration of medicines. The measurement by questionnaire regarding antibiotic use drew out the basic knowledge of the health workers. They had studied at different colleges and schools, all of which had different curricula but were providing a low level of training/education. It has to be a concern, that with such high levels of responsibility the majority of the community staff were only educated to secondary level (50%) or primary level (35%), and that in total only 6 of 56 members were medical doctors.

The three interlinked investigation in the first stage of the study revealed a very high rate of administration of antibiotics with approximately 80% of patients being given antibiotics. This is in clear and direct contrast with the figures from international studies, where for example Steinke et al [26] suggest it is 33% and Wickens [26] found it to be 35% in the UK. It is locally, nationally and internationally recognized that non-compliance or incomplete antibiotic treatment has greatly increased antibiotic resistance [28], but in this study, only 16.1% (9 health workers) [29] reported that this was a problem for them. This low result was surprising in view of the fact that antibiotics are freely bought and there is a wealth of anecdotal and hospital data regarding incompletion of antibiotic treatment in Vietnam [30]. Not all respondents gave further comments, but those that did, revealed knowledge and attitudes that support the need for this study [31]. For example when asked about dosage the response that

"*Three bowls of cooked rice is enough for a meal so three doses of medicine is enough too*."

The total lack of recognition of the prescribing rules and implications of poor practice is alarming, particularly because this type of comment was common, and is supported by the findings from the quantifiable data regarding dosage (see Table 3). Many respondents, showed little theoretical knowledge of either drug dose or duration of treatment; a finding confirmed by the results from the patient records. Overall the responses to the open questions in this section showed both ambivalence and inconsistency, a situation that has to be resolved if members of the public are to receive a safe, adequate and appropriate service. It was evident that there were some key issues regarding administration and there is clearly an urgent need for education and training to improve the knowledge base of the workforce and through that the administration of antibiotics.

The focus groups gave more insight into why this happened, and tended to confirm the review of prescriptions which indicated that the different antibiotics were not fully understood, and therefore often given inappropriately. It was evident that antibiotics were seen as the panacea for most diseases including conditions where antibiotics are unsuitable reference. The percentage of prescriptions with antibiotics prescribed for non-infectious conditions made up 54% of the total prescriptions and even among conditions perceived as infections or related to infection it was certainly possible that a marked number of them were viral.

Table 8. Factors Influencing the Use of Antibiotics of Commune Health Workers

Theme	Quote	Interpretation
Antibiotic use	"The kinds of disease in here are mainly diseases of infection, respiratory tract, digestion, skin, and bones. That why antibiotics are used the most." "The kinds of disease in here are mainly diseases of infection, respiratory tract, digestion, skin, and bones. That why antibiotics are used the most."	Believe that all type of infection were common was typical
Peer and community pressure	"The situation of using much antibiotic is that inhabitants themselves often buy antibiotics without being examined and prescribed by doctors" "If you don't let them use antibiotics they won't listen to you."	There was limited medical help, there was, and is a fear of illness and its consequences
Lack of facilities	"We have nothing because we are at commune level. We depend on the symptoms of the diseases to decide whether we should make a physical examination or we let patients talk about their diseases" "There is almost no guidance from the higher level"	A reality of the situation in which the commune workers find themselves, and also commonly seen in other clinical settings in Vietnam
Multiple roles with limited competence	"At other levels, for example provincial level, each person has their own duties. They are responsible for an aspect and they pay attention on only that aspect. We are working at commune level, besides being responsible for each individual aspect, we have to cover everything…So we need everything." "We only know that they are antibiotics so we don't feel confident when we give prescription to patients. This is called giving the treatment without knowledge. So the effectiveness isn't good."	Commune health workers have a wide range of work to do, but they only have limited education and training
Health insurance as motivation	"Because of the financial limits of the health insurance, each case is only prescribed at 50% of expenditure. Forced and then… they like us very much if we use up 50% for medications per month." "We have to considerate the medication that is available to us. For example, when patient's wound is infected, we have to prescribe… 20 tablets for 5 days. But if the money for it is too high, we only have prescribe 10 tablets plus alpha and paracetamol…"	Benefits people especially in the light of the low incomes of the majority of the Vietnamese population but may lead to negativity on prescribing by health workers

In their long working careers the healthcare workers had received no mandatory in service training or revised programmes focusing on the administration of drugs in general and of antibiotics in particular. Any sessions they had attended used passive lectures which prevented the questioning which could have linked practical antibiotic prescribing to the education. Currently, these health workers at community level also face socio-economic pressures, which include lack of facilities, and limited access to diagnostics tests. Both of these compound the problems caused by their limited training. In addition to these medical/pharmaceutical, cultural-economic factors, a health insurance policy has been introduced and this has created another pressure with patients who have insurance now expecting to 'get something for their insurance policy' in other words to be prescribed antibiotics. These factors, together with the lack of patient education materials in the communities have led to the poor prescribing practices seen.

The analysis of documentary data revealed alarming signs of problems with the antibiotic prescribing practice of the community health workers. The number of prescriptions for/with antibiotic was very high, with about 80% of the total client/patient consultations resulting in antibiotics being given by the community health workers. Antibiotics were prescribed for most diseases/conditions, regardless of whether they were recommended or effective for the condition diagnosed. As a result, the prescriptions for or with antibiotics for patients and or clients with non-infectious conditions accounted for 54% of the total.

Insights from analysis of transcripts from the focus group discussions revealed key concerns regarding the processes used in deciding whether or not to prescribe. Beside the factors identified previously, the health workers themselves conceded that some of their problems arose from their cultural beliefs, their low level of qualifications, and lack of knowledge and competence regarding the multiple roles that they have found themselves carrying out. They struggled with the high level of responsibility, with little official recognition of this in terms of education, training, remuneration and career possibilities Also, this was the first time they had actually seen proof that the health insurance policy appeared to have led to increased prescribing. They accepted that this was yet another of the challenges and difficulties they faced, but could offer no solutions.

5. Conclusion and Recommendation

This evaluation study of the current use of antibiotics in the studied community, revealed a detailed picture in which the health workers at community level are clearly undertaking duties for which they do not have sufficient education and training. Few had attended updating courses, and none demonstrated the critical thinking or problem solving skills necessary if prescribing is to be appropriate in both clinical and patient terms. It is not acceptable those health workers with such a high responsibility for the health of their community are not able to access new information and that there is no mandatory assessment of the competence, no matter how many years they have been in practice. The study demonstrated the urgent need to improve the use of antibiotics in the community, and that any education and training interventions need to take into account the subjective nature of the problems identified and the context in which health care is delivered. If steps are not taken to change this situation then the misuse of antibiotics will continue and the problems of bacterial resistance will continue to grow exponentially. As a result of this study, a second research study has been recommended to develop and trial a conceptual framework and model for the education and training of health care workers focusing specifically on antibiotic administration.

References

[1] World Health Organization (WHO). (2000a). *The Report on Infectious Diseases 2000.* www.who.int/infectious-disease-report/2000.

[2] Dung, P.H., Minh, H.V., et al. (2000) Report of good prescribing practice. *The workshop on rational use of drugs*, 1999. Institute of Strategy and Policy of Health. Hanoi (in Vietnamese).

[3] Larsson, M., et al. (2000) Antibiotic medication and bacterial resistance to antibiotics: a survey of children in a Vietnamese community. *Tropical Medicine and International Health*, Vol 5, No.10, pp. 711-721.

[4] Hoang et al, (2009) A survey on the perception and knowledge of commune health workers regarding antibiotic use in Myloc district (NamDinh province) *Pharmaceutical Journal*. Hanoi: MOH. Vol. 49, No. 395, pp. 8-13 (in Vietnamese).

[5] Truyen, L.V. (1996) National policy on drugs- Guideline for Vietnamese pharmaceutical industry on the progress of modernization and industrialization. *Pharmaceutical Journal* (1996) 9: p. 4-6 (in Vietnamese).

[6] Valdelin, J., et al. (1992) Doimoi and Health. *Sida evaluation report*. Sida Stockholm: p.47.

[7] Global Antibiotics Resistance Partnership – GARP. (2010) Situation analysis: antibiotic use and resistance in Vietnam Washington: CDDEP.

[8] Vinh, N.T., et al. (2006) The report of Antibiotic Susceptibility Test Surveillance (ASTS). *Clinical Pharmaceutical Information*. Vietnam: Swedish International Development Agency (in Vietnamese).

[9] Stuart, B.L. (2004) *Global misuse of antibiotics affects our ability to treat infectious diseases.* Faculty of Health Sciences Centre. McMaster University. http://www.journals.uchicago.edu viewed 11/07/2007.

[10] Ministry of Health (MOH). (2006a). *Guide to Treatment Common Infection Diseases*. Hanoi: Medical Publishing House (in Vietnamese).

[11] Ministry of Health (MOH). (2004a). *The Document No. 3483/YT-ĐT*, on the guide to implementation the Instruction No. 05/2004/CT-BYT on the rectification of drug provision and utilization in hospitals. Department of Treatment, MOH. Dated on 19/5/2004 (in Vietnamese).

[12] Hoa, N.Q., et al. (2009) Antibiotics and paediatric acute respiratory infections in rural Vietnam: health-care providers' knowledge, practical competence and reported practice. *Tropical Medicine and International Health*; Vol. 14, No. 5, pp. 546-555.

[13] Phan, D.V., and Chuc, N.T.K. (1996) An assessment of advertising activity on health workers. *The yearbook of scientific researches*, 1996. Hanoi Medical University. 8:p. 21.

[14] Anderson, D. (2004) The global threat of antibiotic resistance: Exploring Roads towards Concerted Action. *Background Document*. A multidisciplinary meeting at the Dag Hammarskjöld Foundation Uppsala, Sweden, 5-7 May 2004.

[15] Lewis, R. (1995) The Rise of Antibiotic Resistance Infection. *FDA Consumer Magazine.*29(7), http://www.fda.gov/fdac/features/795_antibio.html, last updated 25/2/2009, accessed 20/6/2009.

[16] Cars, O., and Nordberg, P. (2004) *Antibiotic resistance – The faceless threat.* A Multidisciplinary Meeting at the Dag Hamarskjöld Foundation, Uppsala, Sweden, 5-7 May 2004.

[17] Huitric, E., Verhasselt, P., Koul,A., Andries, K., Hoffner, S., Andersson, D. (2009) Rates and mechanisms of resistance development in Mycobacterium tuberculosis to a novel diarylquinoline ATP synthase inhibitor Antimicrob. Revised version. *Agents Chemother.*

[18] Anderson, D. (2003) Persistence of antibiotic resistant bacteria. *CurrOpinMicrobiol*; 6:452-6.

[19] Nordberg, P., Monnet, D.L., Cars, O. (2005) Antibacterial drug resistance: Options for concerted action. *Background Document.* Department of Medicines Policy and Standards. WHO.

[20] Huong, N.L. (2006) The impact of health sector reforms on human resource for health at local level, *Case study of Vietnam.* Hanoi: Ministry of Health of Vietnam.

[21] Bryman, A. (2008) *Social research methods,* (third edition). Oxford: Oxford University Press.

[22] Corbin, J., Strauss, A. (2008) *Basics of qualitative research,* (3ed). London: Sage Publications.

[23] World Health Organization (WHO). (2000b) *WHO "Sample Size Determination in Health Studies"* software, version 2.021 (release 2) (00.07.11) Copyright (c) Chuah Aaron.

[24] Patton, M.Q. (2002) *Qualitative research and evaluation methods* (3rded.). Thousand Oaks, CA: Sage.

[25] Ministry of Health (MOH). (2004b) *Vietnamese National Drug Formulary.* Hanoi: MOH (in Vietnamese).

[26] Steinke, D.T., Bain, D.J.G., MacDonald, T.M., Davey, P.G. (2000). Practice factors that influence antibiotic prescribing in general practice in Tayside. *Journal of Antimicrobial Chemotherapy.*46, 509-512.

[27] Wickens, H., and Wade, P. (2004). The right drug for the right bug-continuing professional development pages. *The pharmaceutical Journal*, 26 March 2004 Vol 274:365-368.

[28] World Health Organization (WHO). (2002). Antimicrobial resistance. *Fact sheet No 194*. Revised January 2002. http://www.who.int/mediacentre/factsheets/ fs194/en.

[29] Pechère, J.C., Hughes, D., Kardas, P., Cornaglia, G. (2007) Non-compliance with antibiotic therapy for acute community infections: a global survey. *Int J Antimicrob Agents.* Volume 29, Issue 3, Pages 245-253.

[30] Awad, A.I., Eltayeb, I.B., Baraka, O.Z. (2006) Changing antibiotics prescribing practices in health centers of Khartoum State, Sudan. *Eur J ClinPharmacol,* 62: 135-142. 3 January 2006.

[31] World Health Organization (WHO). (2001a) On the antibacterial action of cultures of a penicillium, with special reference to their use in the isolation of B influenza by Fleming A. 1929 cited from British Journal of Experimental Pathology 10: 226-236. *Bulletin of World Health Organ.*2001; 79(8): 780-790.