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DO THAI HOA

SITUATION OF HYPERTENSION AND DIABETES AMONG THE 40-59 YEARS-OLD GROUP IN DONG SON, THANH HOA AND EFFECTIVENESS OF SEVERAL INTERVENTION MEASURES

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ABSTRACT OF MEDICAL PHD DISSERTATION

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LIST OF PUBLICATIONS RELATED TO CONTENTS OF THE DISSERTATION

1. **Do Thai Hoa, Nguyen Thi Thuy Duong, Nguyen Thanh Long, Truong Viet Dung, Phan Trong Lan** (2015), "The situation of prevalence of hypertension, diabetes and health care needs in the middle age group young (40-59) at the Dong Son district, Thanh Hoa, 2013 ", *Journal of preventive Medicine*, Volume 25, Number 8 (168) 2015, pg. 381 - 390.
2. **Do Thai Hoa, Nguyen Thi Thuy Duong, Nguyen Thanh Long, Truong Viet Dung, Phan Trong Lan** (2015), "The situation of knowledge and risk behaviors for NCDs in the middle age group (40-59) at the Dong Son district, Thanh Hoa province, in 1013, "*Journal of preventive Medicine*, Volume 25, Number 8 (168) 2015, pg. 371 - 380.
3. **Do Thai Hoa, Truong Viet Dung, Nguyen Thanh Long** (2015), “Effectiveness of several prevention and management measures on patients of hypertension and high blood sugar among the middle aged in Dong Son, Thanh Hoa”, *Journal of Community Medicine*, Iss. 22 – 8/2015, pg. 4-8.

INTRODUCTION

Hypertension and diabetes are two chronic comorbidities as many studies have confirm their strong relationships. Their consequences are severe and challenging, thus recommendations emphasize on the strategic goal of multi-level prevention based on early diagnosis and detection of risky factors. In Vietnam, there have been several studies on hypertension and diabetes yet they mostly focus on the elderly but less on other groups, especially the middle aged, whereas early prevention measures need to be implemented in this stage to reduce prevalence in later stages.

Dong Son is an agricultural delta district, contiguous with Thanh Hoa City of Thanh Hoa Province. In recent years Dong Son has undergone rigorous economic and social development; however, health care mission has faced difficulties and challenges due to increasing noncommunicable conditions, especially hypertension and diabetes. Based on these arguments, we implemented this research with the following objectives:

1. Describe the situation and several factors related to hypertension and diabetes among the middle aged (40-59) in Dong Son District, Thanh Hoa Province in 2013.

2. Evaluate effectiveness of several prevention and management measures for the middle aged (40-59) patients of hypertension and diabetes in Dong Son, Thanh Hoa.

*** New contribution of the dissertation:**

- Described situation of hypertension and diabetes among the middle aged (40-59 years old) residing in a rural area undergoing urbanization with new valuable and specific findings, based on those to design intervention measures for community-based prevention and control of hypertension and diabetes.

- Evaluated effectiveness of several prevention and management measures for patients of hypertension and diabetes among the middle aged

in community, which were simple, applicable, and feasible.

*** The structure of the disstation:** consisting of 139 pages: Introduction 2 pages; Chapter 1-Literature review: 36 pages; Chapter 2-Subjects and research methods: 28 pages; Chapter 3-Results: 35 pages; Chapter 4-Discussion: 35 pages; Conclusions: 2 pages; Recommendations: 1 page; 52 tables; 7 figures; 3 pictures; 5 appendices; 150 references (87 in Vietnamese; 63 in English).

Chapter 1
LITERATURE REVIEW

1.1. Hypertension and diabetes in the world and in Vietnam

1.1.1. Hypertension

Hypertension has been an emerging issue due to rapid increase in community. The World Health Organization (WHO) estimated 1.5 billion people with hypertension globally by 2012. The condition has quickly increased among developing countries in Asia and Africa. In Vietnam, a survey of National Heart Institute in 2012 found that the hypertension prevalence was 27.4% among those 25 years of age and older.

1.1.2. Diabetes

Diabetes is one of common and increasing chronic conditions globally, especially among developing countries. The International Diabetes Federation estimated, globally, that the number of diabetes people were 366 million in 2011 and were projected to be 552 million people in 2030. In Vietnam, the diabete prevalence has also soared in recent years. In 2012, the national prevalence of diabetes among the 30-64 years-old and of impaired glucose tolerance were 5.4% and 12.8%, respectively.

1.2. Several factors related to hypertension and diabetes

1.2.1. Several factors related to hypertension

Age, weight, gender, high salt diet, high alcohol drinking, low physical activity, smoking…

1.2.2. Several factors related to diabetes

Age, gender, genetic factors, lifestyle and environmental factors, risk factors of gestational diabetes, obese, hypertension, reduced glucose tolerance (pre-hypertension) …

1.3. Several community-based management of hypetension and diabetes patients

1.3.1. Interventions for community-based hypertension control

** Interventions for hypertension control in the world:*

- Health education and community awareness improvement
- Hypertension control integrated to primary health care
- Physical activity intervention: light aerobic…

** Interventions for hypertension patient management in Vietnam*

- Evaluation of health education on hypetension at commune health stations (CHS)
- Hypertension outpatient management of postal profession
- Hypertension management, monitoring, and detection of the elderly

1.3.3. Interventions for community-based diabetes control

** International model:*

- WHO recommends strategies on diet and physical activity
- Build monitoring program on diabetes and nutrition
- Integrate diet, physical activity and medical treatment
- Use of Metformin for diabetic high-risk groups

** In Vietnam:*

- Lifestyle change intervention for pre-diabetes groups
- Community lifestyle intervention for type-2 diabetes prevention

Chapter 2

SUBJECTS AND RESEARCH METHODS

2.1. Subjects, study sites, and time frame

2.1.1. Subjects

- People of 40-59 years-old, regardless of gender, in Dong Son, Thanh Hoa.

- All staff at CHS and village collaborators at study sites.

- Commune health stations: Infrastructure, equipment, medicines …

2.1.2. Study sites

In 4/16 communes and towns of Dong Son District, Thanh Hoa Province, including: Dong Hoang, Dong Khe, Dong Quang, Dong Yen.

2.1.3. Time frame: From 1/2013 - 12/2014

- Stage 1: study on situation, from 1/2013 – 5/2013.

- Stage 2: study on intervention, from 6/2013 – 12/2014.

2.2. Research methods

2.2.1. Observational, cross-sectional research

** Sample size and sampling for observational, cross-section research:*

- Sample size for observational, cross-sectional research:

$$n = Z^2_{(1-\alpha/2)} \frac{p.(1-p)}{(p \cdot \varepsilon)^2}$$

In which:

n: minimal sample size of the middle aged (40 - 59 years old)

Z: standard score, confidence level α = 5%, $Z_{(1-\alpha/2)}$ = 1,96

ε: margin error, selected ε = 0,12

p: Prevalence of hypertension and diabetes among the 40-59 group. Many studies show higher prevalence of hypertension than diabetes. To achieve representative sample for these 2 groups, we selected p as the proportions of pre-diabetes and pre-hypertension among the 40-59 group.

A study by National Endocrine Hospital in 2012 showed these proportions of 19.1%, thus p = 0.191.

These values give n = 1,130, with extra 5% for drop-out prevention, n = 1,187, rounded to be 1,200. In practice, we surveyed 300 people/commune, the total subjects in the study were: 300 x 4 = 1,200.

- Sampling for observational, cross-sectional research

Selecting 4 communes of Dong Son District by simple random sampling. Sample size was evenly allocated to 4 communes of 300 people. Subjects of each commune were selected by systematic random sampling.

** Observational, cross-sectional research methods*

- Direct interview

- Clinical examination, test, anthrometrics

2.2.2. Community intervention with control group research

** Sample size and sampling for community intervention research:*

- Sample size for community intervention research:

$$n = \frac{\left\{ z_{1-\alpha/2}\sqrt{2\bar{P}(1-\bar{P})} + z_{1-\beta}\sqrt{P_1(1-P_1)+P_2(1-P_2)} \right\}^2}{(P_1-P_2)^2}$$

In which:

n: minimal sample size of the middle aged; $\alpha = 0.05$; $\beta = 0.02$.

Z : standard score, confidence level $\alpha = 5\%$, $Z_{(1-\alpha/2)} = 1.96$

p_1: Proportion of diabetes patients (40 - 59) with sufficient pre-intervention knowledge. A study in Cau Ngang District, Tra Vinh Province showed this proportion of 24.0% in 2012, thus $p_1 = 0.24$.

p_2: Proportion of diabetes patients (40 - 59) with sufficient post-intervention knowledge, the expected proportion is 40.0%, $p_2 = 0.40$.

These values give n = 270, with an extra of 10% for drop-out prevention, n = 297, rounded to be 300. In practice, we surveyed on 300 subjects in intervention commune and 300 in control commune.

** Sampling for community intervention research:*

We purposefully selected 2 non-contiguous among 4 communes of cross-sectional study, with similar conditions for intervention and control. As the result, Dong Hoang and Dong Yen communes were selected as intervention and control, respectively. All subjects participating in the cross-sectional study were invited into the intervention study. Actually no object to give up, so the object before and after the intervention in social intervention and control communes are completely alike.

- *Community intervention research methods:*

+ Design intervention measures

+ Implement intervention measures

+ Evaluate effectiveness of interventions

** Indicators for evaluating intervention effectiveness:*

- Indicators for evaluating patient management

- Indicators for evaluating risk reduction

- Indicators for evaluating hypertension, diabetes, anthrometric reduction

2.3. Contents and indicators of research

2.3.1. Contents of interviews

- Personal information; Needs and access to general health services

- Knowledge of non-communicable diseases, hypertension, diabetes

- History of hypertension, diabetes; Lifestyle, habits…

2.3.2. Contents of anthrometrics, clinical examinations, test

** Anthrometrics:*

- Height, weight

- BMI = weight (kg)/[height (m)]^2

- Waist circumference (WC), hip circumference (HC), WHR = WC/HC

** Clinical examination:* Blood pressure

** Blood sugar test:* Rapid test method

2.3.3. Standard for diagnosis and risk factor identification

- Hypertension: Apply adult hypertension classification of JNC-7 and Decision No. 3912/QD-BYT on 8/31/2010 of Ministry of Health on issuance of instruction on diagnosis and treatment of hypertension.

- Diabetes: Base on diabetes and blood sugar disorder diagnosis standards of WHO in 1999 and Decision No. 3280/QD-BYT on 9/9/2011 of Ministry of Health on community screening standards.

- High WC: ≥ 90 cm among males; ≥ 80 cm among females

- High WHR: ≥ 0.95 among males; ≥ 0.85 among females.

- Overweight: BMI between 23 - < 25 kg/m^2; obese: BMI ≥ 25 kg/m^2.

2.4. Data management and analysis

- Data was managed and analyzed by SPSS 13,0
- Univariate and multivariate logistic regression
- Use biomedical statistics algorithms

2.5. Control of errors

- Questionnaires were designed and piloted
- Interviewers and supervisors were trained before implementation
- Randomly double-checked 10% of responses.

2.6. Ethical issues

- The proposal was approved by Medical Ethics Committee
- The research merely aimed at community health promotion
- The research was conducted with voluntary consent of subjects.

2.7. Implementation and participants

- Closely coordinate with local authority and health. Closely monitoring and supervision during the progress.

- Participants: the PhD candidate, staff of the District General Hospital, District Health Centre and CHS, Department of Health, academic advisors.

Chapter 3
RESULTS

3.1. Situation and factors related to hypertension and diabetes of the sample

3.1.1. Personal characteristics of the sample

Total sample size was 1,200 in the middle aged group (40-59). The 50-59 years-old group was more than the 40-49 counterparts (54.7% and 45.3%, respectively), proportion of females was higher than males (57.4% and 42.6%), most (89.5%) were farmers, 15.2% were poverty/sub-poverty.

3.1.2. Situation of hypertension and diabetes of the sample

Table 3.5. Hypertension of the sample

Hypertension	Males (n = 511)		Females (n= 689)		Total (n = 1200)		p
	N	%	N	%	N	%	
No hypertension	111	21.7	285	41.4	396	33.0	0.000
Pre-hypertension	271	53.0	297	43.1	568	47.3	0.001
Stage 1 hypertension	92	18.0	78	11.3	170	14.2	0.001
Stage 2 hypertension	37	7.2	29	4.2	66	5.5	0.023

Pre-hypertension, stage 1 and stage 2 hypertension proportions were 47.3%, 14.2%, and 5.5.%, higher among males with $p>0.05$ and $p<0.001$.

Table 3.7. Blood sugar rapid test results of the sample

Rapid test results	Males (n = 511)		Females (n= 689)		Total (n = 1200)		p
	N	%	N	%	N	%	
Normal	420	82.1	581	84.3	1001	83.4	0.326
Pre-diabetes	68	13.4	80	11.6	148	**12.3**	0.377
Diabetes	23	4.5	28	4.1	51	**5.3**	0.711

12.3% of subjects had pre-diabetes, higher among males than females (13.4% and 11.6%), $p>0.05$. Proportion of diabetes was 5.3%, higher among males than females (4.5% and 4.1%), $p>0.05$.

3.1.3. Knowledge and practice of hypertension and diabetes prevention of the sample

Table 3.9. Knowledge of hypertension of the sample (n = 1,200)

Contents		N	%
1. Signs of hypertensions	Headache, dizziness	756	63.0
	Facial flushing	273	22.8
	No signs	409	34.1
	Others	18	1.5
	Don't know/Don't response	363	30.3
2. Need for routine blood pressure check	Yes	975	81.3
	No	222	18.5
	Không biết/không trả lời	3	0.2
3. Knowledge of routine blood pressure time	≤ 6 months/time	801	82.1
	6 months - 1 year/time	135	13.8
	More than 1 year/time	7	0.7
	Don't know/Don't response	33	3.4
4. Complications of hypertension	Hearth complication	192	16.0
	Kidney complication	84	7.0
	Brain complication	659	54.9
	Eye complication	60	5.0
	Vascular complication	45	3.8
	Don't know/Don't response	477	39.8
5. Hypertension treatment	Medicines	471	39.3
	Physical activity	203	16.9
	Diet	381	31.8
	Lifestyle change	129	10.8
	Don't know/Don't response	509	42.4
6. Reduce physical activity	Yes	254	21.2
	No	730	60.8
	Don't know/Don't response	216	18.0
7. General knowledge of hypertension	< 3 items	454	37.8
	3 – 5 items	736	61.4
	6 items	10	0.8

General knowledge of hypertension was very limited; only 0.8% reached 6 items, 61.4% reached 3.5 items and 37.7% less than 3 items.

Table 3.10. Knowledge of diabetes of the sample (n = 1200)

Contents		N	%
1. Symptoms of diabetes	Fatigue, weight loss	376	**31.3**
	More eating, drinking, urination	222	**18.5**
	Urine attracts ants, flies	206	**17.2**
	Probably no symptoms	197	16.4
	Others	5	0.4
	Don't know/Don't response	637	53.1
2. Complications of diabetes	Cardiovascular diseases	177	**14.8**
	Brain vessel complications	86	7.2
	Eye diseases	115	**9.6**
	Kidney diseases/Kidney failure	145	**12.1**
	Foot inflammation and ulcer	70	5.8
	Peripheral neural inflammation	37	3.1
	Long recovered, vulnerable injuries	34	2.8
	Don't know/Don't response	873	72.8
3. Diabetes treatments	Adjust diet	490	**40.8**
	Physical activity	139	11.4
	No alcohol and beer drinking	167	**13.9**
	No smoking	104	8.7
	Routine blood sugar test	441	36.8
	Medicines	146	**12.2**
	Don't know/Don't response	511	42.6
4. Diet for the diabetes	Reduce sugars and carbohydrates	350	**29.2**
	Avoid high fat food	202	16.8
	Diet	824	**68.7**
	Eat more veggies and fruits	208	17.3
	Avoid skipping meals or no meals	525	**43.8**
	Don't know/Don't response	259	21.6
5. General knowledge of diabetes	<2 items	808	67.3
	2 – 3 items	385	32.1
	4 items	7	0.6

General knowledge of diabetes on symptoms, complications, treatments, and diets were very limited: only 0.6% reached 4 items, 31.1% reached 2-3 items, and 67.3% reached less than 2 items.

Table 3.11. Use of tobacco of the sample (n = 1200)

Age group	Males (n_1)		Females (n_2)		Total ($n=n_1 + n_2$)	
	N	%	N	%	N	%
40 - 49 ($n_1 = 221$, $n_2 = 322$)	149	67.4	0	-	149	27.4
50 - 59 ($n_1 = 290$, $n_2 = 367$)	193	66.6	4	1,1	197	30.0
Total ($n_1 = 511$, $n_2 = 689$)	342	**66.9**	4	**0.6**	346	**28.8**
p (χ^2)	0.060		0.836		0.333	

The general smoking prevalence among the middle aged was 28.8%, much higher among males than females (66.9% and 0.6%). The prevalence was higher among 50-59 group than 40-49 group (30.0% and 27.4%). Yet the prevalence was very high and equal among males of both age groups (67.4% and 66.6%), p>0.05.

Table 3.13. Alcohol and beer drinking of the sample (n=1200)

Characteristics	Males		Females		Total	
	40-49 N(%)	50-59 N(%)	40-49 N(%)	50-59 N(%)	40-49 N(%)	50-59 N(%)
- Currently drinking	179 (81.0)	226 (77.9)	12 (3.7)	27 (7.4)	191 (35.1)	253 (38.5)
- Currently not drinking	14 (6.3)	22 (7.6)	7 (2.2)	13 (3.5)	21 (3.9)	35 (5.3)
- Never drinking	28 (12.7)	42 (14.5)	303 (94.1)	327 (89.1)	331 (61.0)	369 (56.2)
- Total	221 (100)	290 (100)	322 (100)	367 (100)	543 (100)	657 (100)
p	0.695		0.062		0.181	

Within 30 days before the interview, the prevalence of drinking was higher in the 50-59 age group than the 40-49 age group (38.5% and 35.1%). The proportion was much higher among males in both age groups (77.9% and 81.0% against 7.4% and 3.7%).

Table 3.14. Consumption of veggies and fruits of the sample (n =1200)

Consumption of veggies and fruits	Males		Females		Total	
	40-49 N(%)	50-59 N(%)	40-49 N(%)	50-59 N(%)	40-49 N(%)	50-59 N(%)
- No consumption	10 (4.5)	21 (7.2)	12 (3.7)	15 (4.1)	22 (4.1)	36 (5.5)
- 1 - 4 portions/day	169 (76.5)	225 (77.6)	226 (70.2)	265 (72.2)	395 (72.7)	490 (74.6)
- ≥5 portions/day	25 (11.3)	29 (10.0)	51 (15.8)	50 (13.6)	76 (14.0)	79 (12.0)
- Don't know/Don't response	17 (7.7)	15 (5.2)	33 (10.3)	37 (10.1)	50 9.2	52 (9.7)
Total	221 (100)	290 (100)	322 (100)	367 (100)	543 (100)	657 (100)
p	0.695		0.434		0.327	

Proportions of the middle aged in two groups (40-49 and 50-59) eating 5 or more portions of veggies and fruits were 14.0% and 12.0%, 1-4 portions/day 72.7% and 74.6%. There were 4.1% and 5.5% not eating veggies and fruits. Estimates were uneven across age groups and genders

3.1.4. Several factors related to hypertension and diabetes

Table 3.16. BMI, WC/HC of the sample

Contents	Males (n = 511)		Females (n = 689)		Total (n = 1200)		p
	N	%	N	%	N	%	
1. Body mass index (BMI):							
- Not increase	405	79.2	533	77.3	938	78.2	0.635
- Overweight	75	14.7	103	14.9	178	**14.8**	
- Stage 1 obese	28	5.5	51	7.4	79	**6.5**	
- Stage 2 obese	2	0.4	1	0.2	3	0.3	
- Stage 3 obese	1	0.2	1	0.2	2	0.2	
2. Waist circumference:							
- High	18	3.5	118	17.1	136	**11.3**	0.000
- Normal	493	96.5	571	82.9	1064	88.7	
3. WHR							
- High	28	5.5	262	38.0	290	**24.2**	0.000
- Normal	483	94.5	427	62.0	910	75.8	

14.8% were overweight, 6.5% were at stage 1 obese, the proportions of stage 2 and stage 3 obese were 0.3% and 0.2%. 11.3% had abnormally high waist circumference (WC). 24.2% had abnormally high waist circumference/hip circumference ratio (WHR).

Table 3.21. Logistic regression models on several factors related to hypertension (n=1200)

Factors	**Hypertension**	
	OR	**$CI_{95\%}$**
1. Gender		
- Females	1	-
- Males	2.03	**1.27 – 3.23**
2. Age group		
- 40 – 49 group	1	-
- 50 – 59 group	**1.88**	**1.34 – 2.57**
3. Occupation		
- Farmers	1	-
- White collars	1.39	0.74 – 2.61
- Others	**2.07**	**1.17 – 3.64**
4. Family economy status		
- Poverty or sub-poverty	1	-
- Average or better	1.00	0.65 – 1.53
5. Obese status		
- Normal	1	-
- Overweight, obese	**2.04**	**1.45 – 2.53**
6. WHR		
- Normal	1	-
- High	**1.52**	**1.03 – 2.24**
7. Drinking behavior		
- <1 day/week or no drinking	1	-
- 1 day/week or more	1.16	0.76 – 1.76
8. Smoking		
- No smoking or no daily smoking	1	-
- Daily smoking	0.93	0.60 – 1.46
9. Cooking oil		
- Vegetable oil	1	-
- Animal oil	0.83	0.60 – 1.15

Factors	Hypertension	
	OR	**$CI_{95\%}$**
10. Physical activity		
- Light intensity	1	-
- Moderate intensity	0.93	0.67 – 1.30
- Vigorous intensity	1.35	0.85 – 2.16
11. Knowledge of hypertension		
- Not sufficient	1	-
- Sufficient	0.82	0.60 – 1.13
12. Knowledge of non-communicable diseases		
- Not sufficient	1	-
- Sufficient	1.17	0.82 – 1.66
13. Blood sugar disorder		
- No disorder	1	-
- Disorder	1.15	0.78 – 1.68

Results from the multivariate logistic regression showed that, after controlling confounders and holdings constant other factors, probability of hypertension was 2.03 times higher among males ($CI_{95\%}$= 1.27 – 3.23). The probability in the 50-59 age group was 1.88 times higher ($CI_{95\%}$= 1.34 – 2.57). The group of other occupation (informal jobs, self-employed...) was 2.07 times higher of hypertension ($CI_{95\%}$= 1.17 – 3.64) than farmers. Overweight and obese group were 2.04 ($CI_{95\%}$= 1.45 – 2.53) and 1.52 ($CI_{95\%}$= 1.03 – 2.24) times higher of hypertension than normal group. However, relationships were not found between hypertension and drinking and smoking behaviors, use of animal oil for cooking, low physical activity, knowledge of hypetension, non-communicable disease and blood sugar disorder.

Table 3.26. Logistic regression models on several factors related to diabetes among the middle aged (n=1200)

Factors	Diabetes	
	OR	**$CI_{95\%}$**
1. Gender		
- Females	1	-
- Males	1.28	0.78 – 2.09
2. Age group		
- 40 – 49 group	1	-
- 50 – 59 group	1.23	0.9 – 1.68
3. Occupation		
- Farmers	1	-
- White collars	0.87	0.42 – 1.81
- Others	0.95	0.49 – 1.84
4. Family economy status		
- Poverty or sub-poverty	1	-
- Average or better	1.05	0.68 – 1.62
5. Obese status		
- Normal	1	-
- Overweight, obese	1.05	0.72 – 1.53
6. WHR		
- Normal	1	-
- High	1.25	0.85 – 1.86
7. Drinking behavior		
- <1 day/week or no drinking	1	-
- 1 day/week or more	1.21	0.76 – 1.93
8. Smoking		
- No smoking or no daily smoking	1	-
- Daily smoking	0.87	0.53 – 1.42
9. Cooking oil		
- Vegetable oil	1	-
- Animal oil	1.16	0.82 – 1.64
10. Physical activity		
- Light intensity	1	-
- Moderate intensity	1.30	0.92 – 1.82
- Vigorous intensity	0.94	0.55 – 1.61

Factors	Diabetes	
	OR	**$CI_{95\%}$**
11. Knowledge of hypertension		
- Not sufficient	1	-
- Sufficient	1.01	0.91 – 1.13
12. Knowledge of non-communicable diseases		
- Not sufficient	1	-
- Sufficient	1.22	0.83 – 1.78

Results from the multivariate logistic regression showed that, after adjusted, no factors were signficant on diabetes among the middle aged. However, it tends to increase the incidence of diabetes in male groups; group 50-59 years old; office worker; overweight ... with OR from 1.05 to 1.52.

3.2. Effects of prevention and management measures on hypetension and diabetes in the middle aged group

3.2.1. Post-intervention change in hypertension and diabetes prevalence and some anthrometric indicators

Table 3.30. Effects on overweight and obese reduction and prevalence of hypertension and diabetes of the sample

Unit: %

BMI	***Intervention commune (n = 300)***			***Control commune (n = 300)***			***Intervention effectiveness (IE)***
	Pre	***Post***	***EI***	***Pre***	***Post***	***EI***	
1.Overweight, obesity							
- Overweight	16.7	12.7	24.0	12.0	203	69.2	93.2
- Obesity	9.0	8.7	3.3	8.3	7.7	7.2	- 3.9
2.Pre-diabetes and pre-hypertension							
- Pre-diabetes	13.0	4.0	69.2	5.7	20.3	256.1	325.4
- Diabetes	4.7	3.3	29.8	2.7	2.3	14.8	15.0
3.Pre-hypertension and hypertension							
- Pre-hypertension	45.7	39.3	14.0	44.3	44.0	0.7	13.3
- Stage 1 hypertension	15.3	11.3	26.1	15.3	19.3	26.1	52.3
- Stage 2 hypertension	4.3	4.0	7.0	8.4	6.4	23.8	- 16.8

After intervention, the overweight, obesity incidences were lower than before intervention (12.7% and 8.7% against 16.7% and 9.0%). But the obesity incidence was higher among the intervention than the control group post-intervention (8.7% and 7.7%). Pre-diabetes and diabetes incidences were lower than before intervention and in control group, EI were 325.4% and 15.0%. Pre-hypertension and stage 1 hypertension incidences were lower than before intervention and in control group, EI were 13.3% and 52.3%. Stage 2 hypertention incidence was lower than before intervention (4.0% and 4.3%) but the rate of reduction was lower than in the control group, thus the EI was lower in the intervention commune.

3.2.2. Effects on knowledge and practice of subjects on diabetes and hypertension prevention and control

Table 3.37. Effects on knowledge improvement of subjects on symptoms, complications and treatments of hypertension

Unit: %

Indicators	***Intervention (n = 300)***			***Control (n = 300)***			***Intervention effectiveness (IE)***
	Pre	***Post***	***EI***	***Pre***	***Post***	***EI***	
Good knowledge of hypertension symptom	48.3	70.3	45.5	38.7	50.3	30.0	15.6
Good knowledge of hypertension complications	4.7	62.0	1219.1	5.3	18.3	245.3	973.9
Good knowledge of hypertension treatment	1.0	19.3	1830.0	1.0	3.0	200.0	1630.0

After intervention, knowledge of symptoms, complications and treatments of hypertension was significantly better than before intervention and the control group, IE were 15.6% - 1630.0%. But even in intervention

group, the pre-post intervention difference was far from expectation, especially the knowledge on treatments of 19.3%.

Table 3.39. Effects on knowledge improvement of subjects on symptoms, complications and treatments of diabetes

Unit: %

Indicators	***Intervention (n = 300)***			***Control (n = 300)***			***Intervention effectiveness (IE)***
	Pre	***Post***	***EI***	***Pre***	***Post***	***EI***	
Good knowledge of hypertension symptom	11.0	56.7	415.5	10.0	12.7	27.0	388.5
Good knowledge of hypertension complications	0.3	38.0	12566.7	4.7	9.7	106.4	12460.3
Good knowledge of hypertension treatment	8.0	59.0	637.5	7.3	16.7	128.8	508.7

Proportions with good knowledge on symptoms, complications, and treatments of diabetes were much better than before intervention and the control group, IE were 388.5%-12460.3%. After 1 year the proportion of good knowledge on symptoms, complications, and treatments of diabetes were lower than the expectation.

Table 3.40. Effects on smoking and drinking behaviors of subjects

Unit: %

Indicators	***Intervention (n = 300)***			***Control (n = 300)***			***Intervention effectiveness (IE)***
	Pre	***Post***	***EI***	***Pre***	***Post***	***EI***	
- Prevalence of smoking	32.0	27.0	15.6	28.7	26.3	8.4	7.2
- Prevalence of drinking 1 or more day/week	23.7	17.3	27.0	30.3	22.3	26.4	0.6

Proportion of smoking was lower than before intervention (27.0% and 32.0%) but equal to the control group (28.7% and 26.3%). Proportion of drinking 1 day or more per week was lower than before intervention (17.3% and 23.7%) and the control group (22.3% and 30.3%).

Table 3.41. Effects on eating veggies, fruits and physical activity of subjects

Unit: %

Indicators	***Intervention (n = 300)***			***Control (n = 300)***			***Intervention effectiveness (IE)***
	Pre	***Post***	***EI***	***Pre***	***Post***	***EI***	
- Prevalence of eating 5 portions of veggies and fruits or more	15,7	29,0	84,7	14,7	16,7	13,6	73,5
- Prevalence of low physical activity	49,7	45,3	8,9	44,7	43,3	3,1	5,8

Proportion of eating 5 or more portions of veggies and fruits per day was much better than before intervention (29.0% and 15.7%) and the control group (29.0% and 16.7%). The proportion of low physical activity was lower than before intervention (45.3% and 49.7%), IE was only 5.8%.

Chapter 4
DISCUSSION

4.1. On situation and factors related to hypertension and diabetes of the middle aged in Dong Son District, Thanh Hoa Province in 2013

** Personal characteristics of the sample:*

In this study the sample consisted of the middle aged (40-59 years-old) regardless of gender. These were yet elderly, but would reach that in the near future, probably in only a few years. This group is influenced by multiple exposures and, thus, has high risk, probably acquiring some chronic conditions, especially non-communicable diseases, including hypertension and diabetes. Early detection of the high risk pool and apply

disease prevention measures to prevent progress to disease in later years. These are reasons for us selecting this age group in the study. Sample size was 1,200, evenly distributed to 4 communes of Dong Son, Thanh Hoa.

** Prevalence of hypertension and diabetes of the middle aged*

For hypertension, results showed that the pre-hypertension, stage 1 and stage 2 hypertention were 47.3%, 14.2%, and 5.5%, respectively. These were higher than the study of Medical Services Administration in 2012. But the hypertention prevalence was lower in Vietnam than other countries of the region though the difference was small, the prevalace was 22.4% in Thailand in 2005 and 25.7% in Malaysia in 2006. For diabetes, results found 12.3% pre-diabetes and 5.3% diabetes. These findings were lower than in STEPS study of Malaysia in 2005 (11.0%), in Thailand in 2005 (8.6%), and in Indonesia in 2004 (5.2%). Results suggest that rural areas of Vietnam should focus on impoving community awareness of hypertension and diabetes to help population thoroughly understand risk behaviors to reduce the incidence, complications and improve effectiveness of management and treatment.

** Factors related to hypertension and diabetes of the middle aged*

The multivariate logistic regression showed, after adjusting for confounders, several factors related to hypertension, namely: age group, sex, occupation, obesity, WHR. But there was no significant relationship between hypertension and drinking, smoking, use of animal oil, low physical activity… Regression results also did not show explicit association between diabetes and research factors in the middle aged. Maybe because our study sample was small, on the other hand research subjects only middle age group, in a purely agricultural province of Thanh Hoa province ... so results are certain restrictions. Further research is needed in similar sites with larger sample size to identify factors related to hypertension and diabetes.

4.2. On effectiveness of prevention and management measures for middle aged patients of hypertension and diabetes.

** Improvement of hypertension, diabetes and some anthrometric prevalences of subjects after intervention*

In this study we applied following measures: Communication – Health education; Early screening for hypertention and diabetes detection; Substantive training for commune and village health workers; Establish network for management and monitoring of hypertension and diabetes patients. After 1 year implementating these measures in Dong Hoang Commune, Dong Son District, Thanh Hoa Province, we observed significant effectiveness compared to before intervention and in control commune (Dong Yen).

Pre-diabetes and diabetes proportions were lower than before intervention and control group, intervention effectiveness (IE) was 325.4% and 15.0%. Pre-hypertension and stage 1 hypertension proportions were lower than before intervention and control group, IE was 13.3% and 52.3%

** Improvement of knowledge and practice of subjects on hypertension and diabetes prevention and control:*

Knowledge on symptoms, complications and treatments of hypertension, diabetes… is necessary to help patients detect diseases early, prevent complications, and adhere to treatment. Results showed that proportions with good knowledge of symptoms, complications and treatment of hypertention, diabetes… were much better than before intervention and control group, IE were 15.6%-1630.0% and 14.9% - 163.9%. Results also found positive changes in practice of hypertension and diabetes prevention and control, IE were 5.8%-73.5%.

CONCLUSION

1. Situation and some factors related to hypertension and diabetes of the middle aged (40-59 years old) in Dong Son District, Thanh Hoa Province in 2013.

**** Situation of hypertension and diabetes***

- Proportions of hypertension and diabetes history were 11.3% and 2.1%, respectively.

- Blood pressure measure: proportions of pre-hypertension, stage 1, and stage 2 hypertension were 47.3%, 14.2%, and 5.5%, higher among males than females with $p<0.05$ and $p<0.001$.

- Blood sugar rapid test: proportions of pre-diabetes and diabetes were 12.3% and 14.2%. These proportions were higher in males than females yet not statistically significant with $p>0.05$.

**** Some factors related to hypertension and diabetes***

- Some factors related to hypertension: gender, age group, occupation, obesity, abnormally high WC, low physical activity, with OR from 1.45-2.24.

- Other factors such as insufficient knowledge on hypertension and non-communicable disase prevention; high WHR; poverty/sub-poverty household economy status influenced hypertension with OR 1.17-1.34.

- Likelihood of diabetes was associated with: males; 50-59 age group; white collars; overweight, obesity; high WC, WHR; alcohol abuse; smoking… with OR 1.05-1.52.

2. Effectiveness after 1-year intervention on prevention and management of hypertension and diabetes patients in the middle aged (40-59 years-old) in intervention commune versus control commune:

**** Improve antrometrics, reduce hypertension and diabetes indicence more than before intervention and control group:***

- The proportions of overweight, pre-hypertension, hypertension, pre-diabetes, diabetes were lower after intervention than before intervention and the control group, intervention effectiveness was 13.3%-325.4%.

- After intervention the proportion of normal blood pressure control was higher in intervention group than control group (45.3% and 32.3%), blood sugar control was desirable in both groups (92.3% and 94.1%).

- Proportion of normal blood pressure was higher in intervention group than control group (45.8% and 31.0%). All diabetic subjects in 2 groups were able to control blood sugar to normal levels

**** Change of knowledge and practice of prevention and control of hypertension and diabetes was significantly improved by many indicators were still less than expectations:***

- Proportion with good understanding of consequences of some risk behaviors to non-communicable diseases were significantly improved in the intervention commune, intervention effects were 102.2%-1511.0%.

- Proportion with good understanding of symptoms, complications and treatments of hypertension and diabetes was significantly improved than the control commune, intervention effects were 15.6%-12460.3%. But there were indicators less than expectation, such as only 19.3% and 59.0% knowing of treatments of hypertension and diabetes.

- Proportions with good knowledge of routine blood pressure measurement and blood sugar test were relatively high (82.6% and 79.9%).

- Positive changes of risky behaviors of hypertension and diabetes.

RECOMMENDATION

1. Behavior change communication needs to maintain implementation at study sites to further improve the knowledge on risk reduction and treatement of hypertension and diabetes (harm reduction) for patients, these are remaining issues after 1 year of intervention.
2. Continue applying experience on community-based hypertension and diabetes patient management, expand interventions to control commune and other regions with similar conditions to confirm the effectiveness and sustainability of intervention measures and serve as foundation for model scale-up.
3. Commune and village health care facilities need to establish systems for monitoring and management of high-risk subjects of hypertension and diabetes at families and community (following family medicine approach), support patients adhering to treatment and behavior change communication.