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CURRENT SITUATION OF ACCIDENT INJURIES IN THE COMMUNITY OF KON TUM PROVINCE IN PERIOD OF 2014 - 2016 AND INTERVENTION RESULTS AT SOME ELEMENTARY SCHOOLS

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INTRODUCTION

Accident injury is a global public health problem, accounting for 16% of disease burden worldwide. At the same time, the injuries due to accident require major social and economic costs for overcoming the consequences.

In Vietnam, accident injuries are complicated and become one of the leading causes of death in hospitals. According to statistics of the Ministry of Health, there are an estimated 3,600 cases of accident injuries and 90 deaths each day. Especially, child injuries due to accident tend to increase and become a public health problem that needs attention.

Kon Tum is a mountainous and border province in the Central Highlands. Socio-economic conditions are facing many difficulties and ethnic minorities account for more than 53%. Although the province has applied many positive measures, the situation of accident injury in Kon Tum is still complicated. During the period of 2012-2014, the number of accident injuries decreased very slowly; some types of injuries that have been rarely encountered are on the rise, such as drowning, suicide ... and the circumstances are also very diverse and complicated. The statistics show that injuries to children should be put under the attention, especially for the primary school students. From the above reasons, the research topic is conducted for the following objectives:

1. Describe the current situation of accident injuries in Kon Tum community in the period of 2014 - 2016 and the knowledge, attitudes and practices of students of primary schools at 4 communes of Tu Mo Rong and Dak Ha districts, in 2016.

2. Evaluate of the results of some intervention measures to prevent accident injuries in primary schools at 2 communes of Dak Ha and Tu Mo Rong districts, Kon Tum province.

*** New contributions of the thesis:**

- The thesis described the current situation of accident injuries in the community of Kon Tum province (2014-2016) with increased rate of incidence and deaths due to accident injuries; the average incidence rate in 3 years was 2,604/100,000 people/year and the mortality rate was 22.8/100,000 people/year. Males have higher incidence rate than females (74.9% versus 25.1%). The incidence among the group of 5 to 19 years old was 16.1%. According to ICD10 classification, the cause of injuries that accounted for the highest proportion was labor accidents (occupational accidents) (23.53%), falls (19.73%) and traffic accidents (17.96%).

- The thesis showed the current low level of knowledge, attitude and practice among elementary school students at 04 surveyed communes. The rate of students knowing about different types of accident injureis is not high: 75.2% know about drowning, 66.1% know about traffic accidents, 60.5% know about falls and less than 50% know about other types. The knowledge, attitude and practice among students about the accident type such as falls, burns, drowning is still at limited level: about 10% of students have incorrect attitude when falling; 10.1% going up and down stairs with not properly right way; 23.7% chosed the wrong treatment when were burned themselves and 8.5% chose the wrong treatment procedure if drowned.

- The thesis has develop and evaluated the results of preventive intervention measures applied for elementary school students at 2 communes: 100% of the intervented schools have the self-assessment result as "Meeting Safe School Standards" (before intervention these were "Not achieved"). The percentage of students who know all 5 types of accident injuries in the intervented group is higher than the control group with the intervention effectiveness reached 23.0%; the

knowledge, attitude and practice about preventionand control of most frequent met 3 accident injury types was enhanced toward positive changes with the intervention effectiveness of 2.3% - 27.7% for falls; 3.3% - 39.8% for burns and 2.8% - 85.6% for drowning.

*** The structure of the thesis:**

The thesis includes 129 pages, including 02 pages for Introduction; 34 pages for chapter of Literature Overview; 20 pages for Chapter of Subjects and research methods; 38 pages for Chapter of Results; 32 pages for Chapter Discussion; 02 pages for Conclusion and 01 page for Recommendation. The thesis has 28 tables, 1 diagram, 19 charts and 120 references including 82 Vietnamese documents and 38 English documents.

Chapter 1. LITERATURE OVERVIEW

1.1. Situation of community accident injury and current stage of knowledge, attitude and practice of elementary school students on injury prevention in the world and in Vietnam

1.1.1. Situation of community accident injuries in the world and in Vietnam

In the world: The death rate due to accident injuries accounts for 9% of global death rate. In 2017, the death rate due to accident injuries was 58.7/100,000 people. In the period of 2006-2015, this rate among children was 40 deaths/100,000 children/year annualy. Road traffic accidents, drowning, burns, falls and food poisoning account for 60% of all deaths due to accident injuries in children.

In Vietnam: Accident injury is the 5th of the top 20 causes of death in 2010. In 2013, there were 1,274,711 cases of accident injury including 0.77% of deaths. Traffic accidents are the leading cause of injuries and deaths, accounting for 38.53% and 57.29%, respectively. On average, each year more than 370,000 children have injuries due to the accidence. The number of children killed by accident injuries

is 6,600 cases/year, accounting for 35.5% of the total number of deaths among children. Drowning is the leading cause of death for children under 19 years old.

1.1.2. Knowledge, attitude and practice of elementary school students on injury prevention and control

Due to the fact that primary school students are young subjects, they are not yet aware of the risks of accident injury and are under the strict protection of adults; in the world and in Vietnam, studies on knowledge, attitude and practice on accident injury are still a small number. One research on knowledge, attitudes and practices related to traffic accidents was carried out on 304 children aged 9-14 years old showed that the practical scores gained by the girls were higher than of the boys ($p < 0.001$). Only 15-30% of children under 7 years of age wear a helmet.

1.2. Strategies, programs and action plans for accident injury prevention and control in the world and in Vietnam

1.2.1. Community-based accident injury prevention for children

WHO has announced an Action Plan for the Prevention and Control of Accident Injuries for Children and Adolescents in the period 2006-2015, emphasizing that the accident injury intervention program in the community needs to understand the context of accident injury situation, the support of local leaders and consult related stakeholders so that appropriate interventions can be implemented, practically. Decrease the traffic accidents among childrent is one of the targets mentioned in Vietnam's National Policy on prevention and conltrol of accident injury. The Project on children accident injury prevention and control funded by the UNICEF has been piloted in 6 provinces; The Project of drowning prevention for Vietnamese children under 5 years old has achieved

certain results. However, the new intervention models are only in pilot. The participation of authorities at all levels is still limited.

1.2.3. School-based injury prevention for children

Many safe school programs (THAT) have brought positive results. “Think first for kid” each year provides education program on accident injury prevention for more than one million kindergartens, students of primary schools and high schools. The "Risk Watch" program is a program that educates children about the risk factors related to accident injury, about the for preventing and combating preventive medicine, and educates children to practice choosing safe behaviors. The Decision No. 4458/QD-BGDDT issued on August 22, 2007 by the Ministry of Education and Training has focused on the construction of safe school (THAT) and accident injury prevention and control. In addition, a number of programs are implemented individually such as "Helmets for Children"; "Traffic safety program at school"; "Safe School Program". However, these programs were not designed and evaluated effectively, there was no effective integration into the content of the school's training curriculum to maintain the sustainability of the program.

Chapter 2. STUDY SUBJECTS AND METHODS

2.1. Study subject, location and time

2.1.1. Study subjects

The study subject consists of 2 groups:

- The cases of accident injuries and deaths due to accident injury occurred in the community within 3 years (2014 - 2016) at Kon Tum province;
- All students at 4 primary schools participated in the study.
- Patient records and reports on medical examination and treatment at the commune health stations (CHS).

2.1.2. Study location

- All 107 communes/wards and towns of 10 districts/cities of Kon Tum province were selected to retrospective data about accident injuries.
- 04 communes (Dak Hring, Dak Mar, Tu Mo Rong and Mang Ri) were selected to conduct the evaluation of pre- and post-intervention stage.

2.1.3. Study time

The study was conducted from 01/2016 - 06/2019, with 2 phases:

- Phase 1: from January to December 2016:
    + Retrospective data collection: from January to December 2016
    + Cross-sectional survey at 04 communes: from August to September 2016
- Phase 2: from September 2016 to June 2019:
    + Implementation of intervention communication - health education about the prevention of accident injury: from September 2016 to June 2017.
    + Mobilization the participation of related stakeholders in developing THAT: from September 2016 to December 2018.
    + Processing and analysing data, writing a thesis: from January - June 2019:

2.2. Study methods

2.2.1. Study design

Cross-sectional descriptive study combined with study the retrospective secondary data and pre- and post-evaluation of community intervention studies using controls.

2.2.2. Sample size and sampling methods

- Cases and deaths due to accident injury: Select all secondary data for 3 years (2014-2016) from the A1/YTCS medical examination record books, A6/YTCS mortality monitoring record books of Kon Tum province.

- The students of primary schools:

+ Sample size for Objective 1 was calculated by formula 1 with p = 0.40 (according to the toolkit testing result, the percentage of students who know 5 or more types of accident injuries is 40.0%); desired accuracy d = 0.03; design effect DE = 2.0. The minimum sample size calculated was n = 2,048 students. At the time of the survey (September 2016), 4 study communes had 2,206 primary students, so the whole sample was included into the study. In fact, 2,194 students were interviewed (reduced by 12 students due to absence at the time of survey or excluded due to insufficient information ...).

+ Sample size for Objective 2 was calculated by comparing the 2 ratio with $\alpha = 0.05$, $\beta = 0.2$, the percentage of students having correct knowledge on accident injury before intervention p1 = 0.42, and that expected after intervention, p2 = 0.60. Calculated sample size needed in each control and intervention group is n = 932.

According to the statistics, the total number of primary school students at 02 intervention communes (Tu Mo Rong and Dak Hring communes) is 1,024 students and those of 2 control communes (Mang Ri and Dak Mar communes) is 1,182 students. Therefore, all primary school pupils of the four communes participating in the descriptive study were selected for intervention study. In which, intervention group: 1,024 students, control group: 1,182 students.

In fact, after an intervention, the intervented group had 1,014 students, down 10 students compared to before the intervention, the control group had 1,129 students, down 41 students compared to before the intervention (due to being absent at the time of investigation or excluded due to having incompleted questionnaire).

Sample selection method: Select according to the purpose two districts: Tu Mo Rong and Dak Ha. In each district, 2 communes were randomly selected. In each commune, all primary schools were selected. At each school, select all students. From selected 2 communes of each district, one intervention commune and the other 1 control commune were randomly selected.

2.2.3. Variables and indicators

- Group of variables on accident injury situation in Kon Tum province and at 4 studied communes such as prevalence, mortality rate, distribution of cases by age group, occupation, cause, place of occurrence ...
- Group of variables on knowledge, attitudes and practices about accident injury prevention and control among primary school students at 4 studied communes in Tu Mo Rong and Dak Ha districts.
- Intervention results: number of schools having steering committees, activities and results of self-assessment according to THATs criteria; the effectiveness and intervention effectiveness index (IE) in improving students' knowledge, attitudes and practices of students on accident injury prevention and control.

2.2.4. Data collection techniques and tools

- Describe the situation of accident injuries: Use the advance prepared questionnaire to collect information about the situation of accident injuries; collect the relevant information on the deaths due to accident injuries.

- Assess the knowledge, attitudes and practices of the primary school students before and after the intervention by using the designed questionnaire.
- Assess the level meeting THAT's criterio by using the checklist.

2.2.5. Develop and implement intervention measures

Mobilizing the participation of related stakeholders in developing the THAT: Establishing a Steering Committee for accident injury preventing in schools; appoint full-time or part-time health workers of the school; conduct the training to improve the capacity on essential injury care, monitoring and statistics skill as well as to improve the report and risk assessing capacity of accident injury at school; implement the intervention activity to decrease accident injury risk factors.

Apply the measures of education and health education for students: Designing and pasting the panels, posters on accident injury issues due to accidents; developing and distributing leaflets to students about preventing burns, falls, and drowning; building a communication corner on injury prevention and fighting; organize extracurricular activities; organizing the integration of content in the flag-raising sessions of the week; organize the contests on accident injury prevention.

2.2.6. Processing and analyzing data

Enter and process data on SPSS for Window 10.5 and Epi info 6.01; Descriptive statistics, analysis ($\chi 2$ test, t-test, ...).

2.3. Errors and corrective measures

- Possible errors: errors due to sampling, errors in questionnaire design, recall errors, errors in questioning, interviews and errors in data entry and analysis**.**
- Error solving measures: Select the intervention group and control group from the same population; use the whole sampling method;

design a detailed survey and test the toolkit before proceeding; full training for the enumerators and supervisors; cross check, clean and add supplement questionnaire information in the community; re-enter 10% of filled questionnaires to check the accuracy of data input.

2.4. Research ethics

Research design was approved by the Medical Ethics Council of the National Institute of Hygiene and Epidemiology. Subjects participating in the study were completely voluntary; subjects of investigation have the right to refuse to answer interviews; all collected data were kept confidential; the study does not affect local customs and practices.

Chapter 3. RESULTS

3.1. Current situation of accident injuries in the community of Kon Tum province (2014-2016) and the status of knowledge, attitudes and practices of primary school students at 4 communes of Tu Mo Rong and Dak Ha districts

3.1.1. General accident injury situation in Kon Tum province

Table 3.1. Incidence rate and deaths due to accident injury in community of Kontum province (per 100.000 people)

Data	***2014 (pop:484.215)***		***2015 (pop:495.876)***		***2016 (pop:507.818)***		***Average (pop:495.970)***	
	Case	*Death*	*Case*	*Death*	*Case*	*Death*	*Case*	*Death*
Number	10,923	57	12,173	112	15,652	169	12,916	112
Rate /100.000	2252.2	11.8	2454.2	22.6	3081.1	33.3	2604.0	22.8

On average in 3 years (2014-2016), Kom Tum province had 12,916 cases with accident injuries/year, the rate of accident injuries was 2,604.0/100,000 people, including 112 deaths/year. The death rate due to accident injuries was 22.8/100,000 people.

Table 3.2. Incidence rate and deaths due to accident injury in community according to the sex

Sex		*2014*		*2015*		*2016*		*Average*	
		Case	*Death*	*Case*	*Death*	*Case*	*Death*	*Case*	*Death*
Male	No	7,321	41	8,521	93	10,606	137	8,816	90
	%	67.02	71.93	70.00	83.04	67.76	81.07	68.26	78.68
Female	No	3,602	16	3,652	19	5,046	32	4,100	22
	%	32.98	28.07	30.00	16.96	32.24	18.93	31.74	21.32

On average, in 3 years, the proportion of male having accident injuries was 2 times higher than that of the female and the mortality rate of male due to the same reason was nearly 4 times higher.

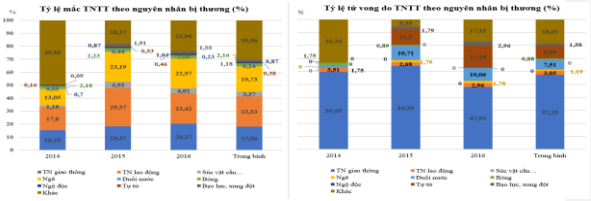


Figure 3.1 Incidence rate and deaths due to accident injuries in community according to the causes (by ICD10)

Among the causes of injury, occupational accidents accounted for the highest incidence rate (23.53%), followed by falls (19.73%), and traffic accidents (17.96%). Among the deaths due to accident injuries, those caused by traffic injury was rated the highest (57.29%), followed by suicide (9.89%), drowning (7.51%) and occupational accidents (3.05%).

3.1.2. Community accident injury situation at 4 studied communes

Table 3.3. Incidence and death rate (per 100,000 people) due to accident injury in community at 4 communes (2004-2006)

District, commune	*2014 (Pop=18,142)*		*2015 (Pop=18,426)*		*2016 (Pop=18,738)*		*Total (Pop=55,306)*	
	Case	*Death*	*Case*	*Death*	*Case*	*Death*	*Case*	*Death*

Tu Mo Rong	Tu Mơ Rông	123	0	115	0	162	0	400	0
	Măng Ri	188	0	192	4	242	4	622	8
Đak Ha	Đắk Hring	226	0	231	0	208	0	665	0
	Đắk Mar	247	0	250	0	245	0	742	0
Total		**784**	**0**	**788**	**4**	**857**	**4**	**2429**	**8**
Rate/100,000		**4321.2**	**-**	**4276.8**	**16.3**	**4573.6**	**16.0**	**4391.3**	**10.9**

In the period of 2014-2016, the annual average rate of accident injuries was 4391.3/100,000 people, including 8 deaths, made the mortality rate due to accident injury of 10.9/100,000 people.

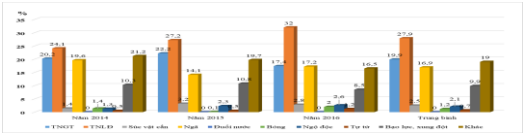


Figure 3.1. Distribution of accident injury incidence at 4 communes by the causes (by ICD10)

The incidence of accident injuries by causes showed that the highest proportion was the occupational accidents (27.9%), followed by traffic accidents (19.9%), and falls (16.9%). In 3 years, 6/8 cases of deaths was due to suicide, 1 case was of traffic accidents and 1 case was of violence.

3.1.3. Knowledge, attitude and practice on accident injury prevention and control at 4 studied communes

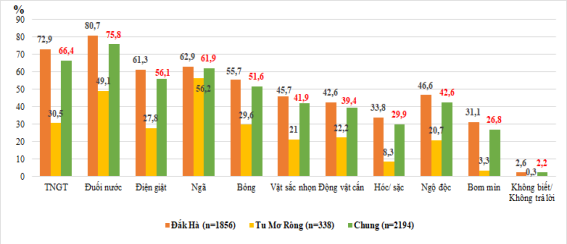
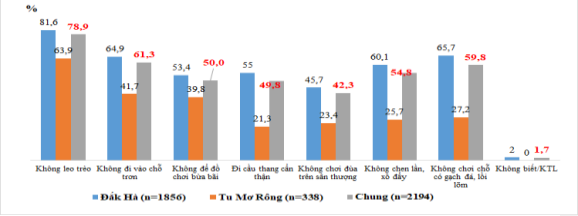


Figure 3.2. Knowledge of primary school students on the type of accident injuries

The rate of primary school students knowing about accident injury type was quite high, of which, the proportion of students knowing about drowning was the highest (75.2%), those mentioned about traffic accidents were 66.1%, followed by falls (60.5%), electric



shock (55.8%), burns (51.3%) and injury due to sharp objects (41.7%).

Figure 3.3. Knowledge of students on fall prevention

The rate of students knowing the measures to avoid falling was highest (78.9%) as do not climb high, do not go on slippery places (61.3%), do not play at areas containing many bricks, convex cores (59.8%), do not push and shove (54.8%).

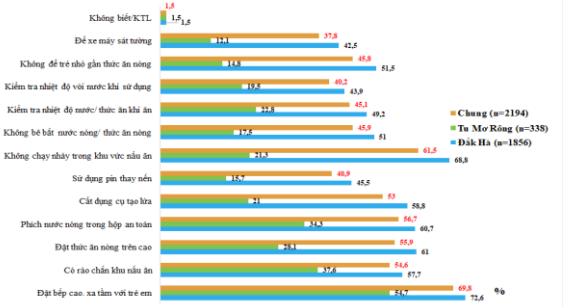


Figure 3.4. Knowledge of students about burn prevention

Knowledge of primary school students about measures preventing burns was at average level with 69.8% knowing about keep kitchen out of reach of children, 61.5% know do not run around in cooking area, 55.9% know the necessary to put thermos containing hot water in safe box, 54.6% know the necessary to have fences for cooking area and about 53% know the necessary to hide the ligters from children.

Regarding knowledge of students about measures to prevent drowning, most of students choosed “do not play near ponds and lakes” (82.6%), “do not play near ponds and lakes” (67.3%), “do not take clothes from ponds and lakes (64.0%). Only some of students mentioned about “do not playing and jumping on bridge (6.3%) and “do not swim in thunderstorms (5.8%).

3.2. Results of intervention against the accident injury at primary schools of 4 studied communes

3.2.1. Results of mobilization of stakeholder's participation

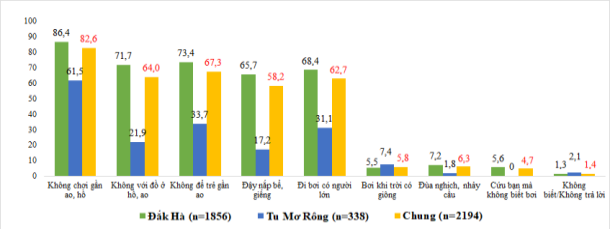


Figure 3.5. Knowledge of students about drown prevention

03/03 of the intervention schools set up the Steering Committee for injury prevention and control and have school health workers; 100% of members of the Steering Committee for injury prevention and control and health staff working in school have been trained to improve their capacity on building safe schools to prevent accident injuries; All 03 intervention schools have the good results of self-assessment after the intervention, that achieved Safe School standards (before the intervention these were Not Satisfactory).

3.2.2. Results of improving student's knowledge, attitudes and practices after health communication and education interventions

Table 3.4. Change of general knowledge of students on accident injuries after intervention

Knowledge	***Intervented group***		***Control group***		***$P_{2,4}$ IE (%)***
	Bef. (1) (n=1024)	***After (2) (n=1014)***	***Bef (3) (n=1170)***	***After (4) (n=1129)***	
Have heard of accident injury (AI)	97.9	99.2	97.2	98.0	<0.05 0.5
Know >5 types of AI	42.3	54.4	44.4	46.9	<0.05 23.0

After the intervention, the percentage of students who have heard about accident injury and know 5 or more types of accident injury in

both intervention and control groups increased, but the intervention group achieved a significant higher rate (p<0,05) with an intervention effect reached 0.5% and 23.0%, respectively.

Table 3.5. Change in the practices about fall prevention among primary school students

Practice	*Intervention group*		*Control group*		$P_{2,4}$ *IE (%)*
	Bef (1)	*After (2)*	*Bef (3)*	*After (4)*	
Performed 4 skills up and down stairs	90.7	94.3	89.2	90.7	<0.01 2.3
Performed 3 skills to manage when falling	53.5	57.4	47.0	48.2	<0.001 4.7
Performed at least 1/4 of wrong steps when going up and down stairs	4.8	3.3	5.7	5.5	<0.05 22.8

The percentage of students performed 4 skills properly when going up/down stairs and 3 skills to manage when falling increased after intervention in both groups, but this of an intervention group increased significant higher (94.3% vrsus 90.7%) and (57.4% versus 48.2%) (p<0.01) with IE reached 2.3% and 4.7%, respectively.

Table 3.6. Change in practice preventing burn among students after intervention

Practice	*Intervention group*		*Control group*		$P_{2,4}$ *EI (%)*
	Bef (1)	*After (2)*	*Bef (3)*	*After (4)*	
Performed 4 skills to manage when burned	8.3	11.6	8.3	8.3	<0.05 39.8
Perform 5 skills to manage when burned	6,6	9.6	3.2	4.6	<0.001 6.2

The rate of students could perform 4 skills to manage and 5 skills to manage when having burnt has been increased after the intervention

in both groups but the differences of these 2 groups were statistically significant (p<0.05 and p<0.001), IE achieved 39.8% and 6.2%.

Table 3.7. Change in practice to prevent drowning among students after intervention

Practice	*Intervention group*		*Control group*		$P_{2,4}$ *EI (%)*
	Bef (1)	*After (2)*	*Bef (3)*	*After (4)*	
Performed 5 drown preventing measures	45.0	55.5	49.9	50.8	<0.05 21.5
Performed properly 3 manage skills when facing drowning case	56.1	64.9	53.1	58.5	<0.01 5.5
Practice 5 skills correctly when rescued drowning person ashore	26.0	30.9	22.6	25.3	<0.01 6.9
Trying to struggle due to fear and sinking into the water	8.6	4.1	8.5	7.9	<0.001 45.2
Performed at least 1/3 of wrong measures on drowning prevention	8.4	6.7	11.5	10.1	<0.01 8.0
Performed at least 1/2 of wrong actions when meeting drowning case	9.0	8.2	14.8	15.5	<0.001 4.2

Regarding the practice, the rate of students who could perform 5 drowning prevention skills and 3 correct handling skills when meeting drowning case, 5 correct handling skills on shore when saving drowned person, increased after the intervention. However, the intervention group rated statistically significant higher (p<0.05

and p<0.01), the intervention efficiency reached 21.5%, 5.5% and 6.9%, respectively. The rate of students performed one of the three wrong measures on drowning prevention and did at least 1 in 2 wrong actions when curing drowning victims, after the intervention, tends to decrease in both groups with the difference statistical significant (p<0.01) and IE achieved 8.0% and 4.2%, respectively.

Chapter 4. DISCUSSION

4.1. Current situation of accident injury in the community of Kon Tum province (2014-2016) and status of the knowledge, attitudes and practices among primary school students at 4 communes

4.1.1. Current situation of accident injury in the community of Kon Tum province (2014-2016)

In the period of 2014-2016, the incidence and death rate per 100,000 people due to accident injury in the community of Kon Tum province increased over time. On average, each year, 12,916 people have injuries due to accidents in the community with the rate of 2,604/100,000 and death rate of 22.8/100,000 people. Compared with the global mortality rate due to accident injuries in 2017 was 58.7/100,000 people, it can be seen that the mortality rate due to accident injuries in Kon Tum is lower. In low- and middle-income countries mortality rate due to accident injuries is four times higher than that of higher-income countries. Meanwhile, the rate of accident injuries in Vietnam per 100,000 people in 2014 was 1,453.6/100,000 people. Estimated death rate due to accident injuries in 2010 in Vietnam was 38.6/100,000 each. It can be seen that the incidence of accident injuries of Kon Tum is higher but the mortality rate is lower than the national average. This can be understood that the rate of accident injuries due to all reasons in rural is higher than in urban

areas and related to economic status, high-income households have a lower risk than the low-income conditions.

Distribution of accident injuries by gender: The study found that among the cases of accident injuries in the community of Kon Tum province in the period of 2014-2016, men accounted for 2 times higher proportion than women (68.26% versus 31,74%). The rate of deaths among men due to accident injuries is nearly 4 times higher than that of females (78.68% compared to 21.32%). This result is in consistence with the results of reviewed several related scientific articles of the world and Vietnam.

Distribution of accident injuries by the causes: The study showed that on average in 3 years (2014-2016), the highest proportion of injuries was occupational accidents (23.53%), falls (19.73%) and traffic accidents (17.96%). This distribution is somewhat different from results obtained by other studies in the world and by previous studies. Most of the previous studies have showed the highest incidence of injuries was from traffic accidents. In Vietnam, the rate of injuries due to traffic accidents is the leading among the causes of accident injuries (38.53%); the death rate due to traffic accidents also ranked first among the causes of death from injuries (57.29%). The global mortality rate due to accident injuries in 2017 was 58.7/100,000 people for all reasons, of which traffic accidents contributed 35%. It can be seen that, in this study, although traffic accidents are not the leading cause of injuries, but it's the main cause of death among the accident injuries. The difference in the model of accident injuries according to the causes in Kon Tum province compared to that of the world and of other cities in the previous studies can be explained by the differences in geographical-socio-economic status of each country, region.

4.1.2. About accident injury situation in community at communes, Kon Tum province

In the period of 2014-2016, the average rate of accident injuries per 100,000 people was 4,391.3/100,000 people in 4 studied communes. Meanwhile, the rate of accident injuries per 100,000 people in 2014 was 1,453.6/100,000 people. However, in the 3-year trend, the rate of accident injuries/100,000 people in all 4 communes has been increased, similar to the general trend of accident injuries situation in Kon Tum province in this period. At 4 communes in 3 years, only 8 deaths were recorded due to accident injuries, much lower than the death rate of the whole province as well as of the world. This result demonstrates the observation that the situation of accident injuries in the community "complicated happenings" and "occurred at very diverse circumstances...".

Regarding the incidence of accident injuries by the causes of 04 communes, the results showed that the highest proportion was occupational accidents (27.9%), followed by traffic accidents (19.9%), and falls (16.9%) ... This distribution is consistent with the overall accident injury distribution in the province. Compared with the previous studies, this distribution is slightly different because in most of the previous studies, the highest incidence of injuries was due to traffic accidents.

4.1.3 The status of knowledge, attitudes and practices onaccident injury prevention among primary school students at 4 research communes

Research showed that the percentage of students knowing about the types of accident injury was quite low. The type of accident injury known by most students was drowning (75.2%), followed by traffic accidents (66.1%), falls (60.5%), electric shock (55.8%), burns (51.3%) and injuries caused by sharp objects (41.7%). All these were

common injury types happended in the community in general and in children in particular. The reason for this findings, in addition to the effectiveness of the grassroots accident injury prevention and control programs implemented locally, is another possible reason that the students who had or witnessed their friends or other children that suffered these types of injuries.

About the measures to avoid falling, 78.9% of students know “not climbing”, 61.3% know “not going to slippery places”, 59.8% mentioned about “not playing at place full of bricks/stones or convex cores, 54.8% choosed “no hustle and shove”, or “do not leave toys indiscriminately” (50.0%),... The results are similar to those of Nguyen Thuy Quynh's research: 48.4% of students have knowledge of safe stair going up/down skills; 52.4% of students are knowledgeable about 4 measures to prevent falls at home, at school and on the way to school.

Regarding 11 measures to prevent burns at home, the percentage of students knowing about these measures in turn is keep the kitchen out of the reach of children: 69.8%, do not run around in the cooking area: 61.5%, put thermos contained hot water in safe box: 55.9%, have fenced cooking area: 54.6% and hide fire-making tools: 53.0% ... These rates are higher than the rates obtained by research of Nguyen Thuy Quynh in Da Nang (28.6% of students have knowledge about 11 burn prevention measureas in the family).

The percentage of students showed to have good knowledge about measures to prevent drowning is quite high, in particular, 82.6% aggried with “do not play near ponds and lakes”, 67.3% aggried with “do not let children play near ponds and lakes”, 64.0% mentioned about “do not try to take things floating in the ponds” and 58.2% aggried with “water tank need to be covered”. Meanwhile, in the study of Nguyen Thuy Quynh, only 56.7% of students in Da Nang

before the intervention had knowledge about measures to prevent drowning.

4.2. Results of intervention measures to prevent accident injuries in community

4.2.1. Results of mobilizing the participation of stakeholders in building safe schools and lessons learned

Results of this study once again proved that the school-based preventive intervention program for primary school pupils is feasible and effective. According to the research results of Nguyen Van Hung, schools were unsafe before the intervention according to 28 criteria specified in the checklist issued by the Ministry of Education and Training. After the intervention period, 100% of schools are eligible to achieve. In order to achieve such results, it is necessary to have the leadership and support of the People's Committee of the commune and the local Education Department, the professional advice of the health sector and especially the efforts of School Administrators and the whole school staff.

4.2.2. Evaluation result of communication - health education on injury prevention for elementary school students

After the intervention, the percentage of students who knew 5 or more types of injuries in the intervention group was higher than the control group ($p<0.05$) with the intervention efficiency of 0.5% and 23.0%.

Concerning the practice, the rate of students correctly performed 4 skills of going up and down stairs and 3 skills of managing when falling, increased after the intervention in both groups but that from an intervention group increased significant higher. Thus, communication interventions at some primary schools in Kon Tum province partly improved the knowledge and practice on accident injury prevention skills due to falls among the students. However,

research could not provided evidence to prove the effectiveness of the intervention in reducing the rate of falls and deaths caused by falls. Currently, there is very little evidence to evaluate the effectiveness of interventions that reduce falls and their consequences in developing countries, in particular, the lack of evidence about the campaigns contributed to reducing the incidence of falls-related injuries, the difficulty in changing the behavior of children, lead to a reduction in the potential effectiveness of active interventions. At the same time, it also shows the paradox of the poorer group who are burdened by greater falls but receive less health-promoting communication messages.

Regarding practice, the rate of students performed 4 skills when get burnt and 5 skills to manage when burned was increased after intervention and the difference of the 2 groups is statistically significant with $p<0.05$. Similar to the results of the Risk Watch educational program, intervention in elementary schools is a demonstration of contributing to improving knowledge and practice on preventing burns for elementary students. However, there has not been a long-term study to evaluate the effectiveness of programs in reducing the incidence of accident injy and deaths from burns. In addition, it is necessary to combine with other strategies such as promulgating legal mechanisms and standards or improving the environment to achieve the objective of anti-burn injuries.

Similar to the results of the Risk Watch educational program, interventions implementing at primary schools are shown to contribute to the improvement of knowledge and practice skills to prevent and control burns risk for students. However, there has not been a long-term study to evaluate the effectiveness of intervention programs in reducing the incidence of injuries and deaths from burn injuries. In addition, it is necessary to combine with other strategies

such as promulgating legal mechanisms, standards or improving the environment to achieve the objective of burn injury prevention and control in sustainable manner.

Regarding the practice, the rate of students who could perform 5 drowning prevention skills and 3 correct handling skills when facing drowning case, 5 correct handling skills when treating drowned case on shore, has increased after the intervention. However, this rate of the intervention group increased significantly higher than that of control group, the difference was statistically significant with $p<0.05$ and $p<0.01$, the intervention efficiency reached 21.5%, 5.5% and 6.9%, respectively. The rate of students performed one of the three wrong measures of drowning prevention and performed at least 1 in 2 wrongdoings when facing drowning victims, tends to decrease in both groups after the intervention with the difference between two groups statistically significant with $p<0.01$ and $p<0.001$, and IE reached 8.0% and 4.2%, respectively. Results of our study are similar to an intervention study conducted on 229 primary school students in Quang Binh province (2018). The strategy to improve children's knowledge and skills is also in line with the recommendations of the World Health Organization, emphasizing that it is essential to impart knowledge and skills to prevent drowning for children and pupils.

4.3. The limitations of the study

The research used cross-sectional description design and retrospective secondary data, the quality of the data obtained therefore might be only timely and affected by the accuracy and completeness of the data from reports, statistics.

Evaluating the results of the intervention model "THAT to prevent and control accident injuries" might be affected by the effectiveness of the prevention activities that have been ar are being implemented in the study sites.

The study did not measure the indirect effects of implemented interventions and has not implemented specific interventions for the target group. The assessment of students' skills only stops at the interview level through case assumptions due to time constraints.

CONCLUSION

1. Current situation of accident injuries in community of Kontum province (2014-2016) and status of knowledge, attitude and practice of primary school students at 4 communes of Tu Mo Rong and Dak Ha districts in 2016

**** Morbidity and mortality rates of accident injuries in the community of Kon Tum province and 4 research communes are higher than the national average, with the most increasing tendency among groups of children, pupils, students; some types of accidental injuries that were rarely encountered before (drowning, poisoning, suicide, conflict ...) are tended to increase nowadays, in particular:***

- Morbidity and mortality rates due to accident injuries in community has been increased gradually with the average incidence rates of 2,604 and 4,391.3/100,000/year and death rates of 22.8 and 10.9/100,000/year.

- The prevalence rate among men was 68.25% and 74.9% for females, 36.29% for group of 5- 19-year-olds, 22.62% and 20.0% for pupils and students, respectively.

- The places where accident injuries occured with the highest rate were: on the road (28.13% and 33.1%), at work (22.48% and 26.7%) and at home (19, 83 and 31.5%).

- Poisoning, drowning, suicide, violence,... accounted for a significant proportion (0.24% - 9.9%).

**** Knowledge, attitude and practice on accident injury prevention and control of primary school students at 4 research communes have certain limitations:***

- The type of accident injury known by most students was drowning (75.2%), traffic accidents (66.1%), falls (60.5%), electric shock (55.8%), burns (51.3%) and injuries caused by sharp objects (41.7%), other types (under 50%).

- Students could have information from various sources, but mainly from mass media (41.1%); from schools or union/team (22.8%) and from family members (7.1%).

- Attitudes and practices of students about falls, burns, and drowning were limited: about 10% of students have incorrect attitude when falling; 10.1% did not perform right procedure when going up and down stairs; 23.7% chose the wrong treatment when getting burned; 8.5% chose the wrong treatment if drowned.

2. Results of some intervention measures to prevent accident injuries at primary schools in 2 communes of Dak Ha and Tu Mo Rong district, Kon Tum province

**** Mobilize the participation of stakeholders in building safe schools.***

- 03/03 intervention schools have set up a Steering Committee to prevent accident injuries and have staff responsible for school health.
- 100% of the Steering Committee members have been trained to improve their capacity on contents of building safe schools to prevent injuries.
- All intervented schools have self-evaluation and post-intervention evaluation results by the Department of Education and Training as achieved the standards of Safe Schools.
- The communication - health education on accident injury prevention and control was conducted for primary school students in

Commented [A11]: Các đoạn bôi màu vàng có vẻ không ăn nhập với kết luận cho mục tiêu, do bản TV có nên vẫn dịch nhưng bỏ đi ở cả bản TV và TA thì kết luận cô đọng và chặt chẽ hơn

2 research communes in many forms: direct communication at the school weekly flag-raising, class extracurricular activities; hand out leaflets, guide skills, competition on injury prevention skills and knowledge...

**** Knowledge, attitude, practice of students on injury prevention significantly improved***

- After the intervention, the percentage of students who have heard about injuries, knew 5 or more types of accident injury were significant higher than the control group ($p<0.05$) with an intervention efficiency of 0.5% and 23,0%.

- After the intervention, students' knowledge, attitudes and practices about prevention and control of falls, burn and drowning were significant changed positively with the intervention effectiveness index of 2.3% - 27.7%; 3.3% - 39.8% and 2.8% - 85.6%, respectively ($p<0.05$).

RECOMENDATION

1. For the Health-Education sector, it is necessary to continue to maintain intervention measures to prevent accident injuries in the intervening communes, and at the same time to implement these in other communes of whole province to improve and confirm the sustainability and effectiveness of intervention solutions.

2. Communication activities on accident injury prevention for students in general and for primary school students in particular should be flexible in both content and form, integrated with extracurricular learning activities and proper group activities.

3. The competent authorities need to strengthen the school health system as required. In the case of absence of health workers, the schools need to have part-time staff to implement school health contents, especially on accident injury prevention.

LIST OF PUBLISHED SCIENTIFIC ARTICLES RELATED TO THIS THESIS

1. **Vo Van Thanh, Pham Van Thao, Nguyen Anh Dung (2018),** "Current knowledge status on accident injuries among students of some primary schools at Tu Mo Rong and Dak Ha districts, Kon Tum province in 2016", Vietnam Journal of Preventive Medicine, Special issue of Scientific Conference of PhD students of National Institute of Hygiene and Epidemiology in 2018, pp 60-66.

2. **Vo Van Thanh, Pham Van Thao, Nguyen Anh Dung et al. (2019),** "Effectiveness of interventions by Health communication - education about accident injury prevention and control at 2 primary schools in Tu Mo Rong and Dak Ha district, Kon Tum province, 2016-2017", Vietnam Journal of Preventive Medicine, No.6/2019, pp.126-131.