The Effect of Applying a Developed Disaster Risk Reduction Guideline on Governmental Primary School Student's Safety Behaviors - Alexandria Governorate, Egypt.

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Abstract: ***Background****:*

Each year, schools all over the world suffer from disasters, ranging from small to large damaging disasters that affect children safety and health. Disaster Risk Reduction (DRR) is a systematic approach to identify, assess and reduce disaster related risk. Children participation in such program enabling them to be positive change makers in their communities. ***Aims:*** this study to develop a disaster risk reduction guideline for governmental primary schools students and to assess the effect of applying developed disaster risk reduction guideline on safety behavior of governmental primary schools student in Alexandria/ Egypt. ***Design:*** A quasi experimental study design was adopted to carry out this study. ***Setting:*** the study was carried out in four primary schools of the educational zone in Alexandria governmental were selected randomly namely (El-Montazah and East zones). ***Subjects:*** 200 primary school students and 35 academic and field experts were selected. ***Tools:*** three tools were used; Tool ***(I)*** Primary school students' disaster knowledge questionnaire, tool ***(II)*** Disaster risk reduction observation checklist, and tool ***(III)*** Guideline revision and evaluation of internal validation "AGREE II Instrument. ***Results:*** The findings of the present study revealed that the implementation of disaster risk reduction guideline training program leads to improved total knowledge and practice score among the studied students. ***Recommendations:*** Developing comprehensive coordination and cooperation agreements between educational institutions and civil society organizations to raise student's awareness about disaster risk reduction and its consequences. Revise curricular materials concerning crisis and disasters management to include all recent information on crises and disaster risk reduction in the schools, and methods of dealing with it. Use mass media to provide more information about safety and disaster management in radio, television, social media and in school curriculum. Distribute media as videos or computers applications for better clarification on disaster crisis management at school. Provide booklet explaining the safety, security & evacuation procedures in effective manner and meet the student's development stage. Provide school approval to do fieldtrip to civil protection, firefighting department and Red Cross/Red Crescent Society.

Key Words: Disaster risk reduction, School children and School Safety.

I. Introduction

World Health Organization (WHO): definition of disaster: "A disaster is an occurrence disrupting the normal conditions of existence and causing a level of suffering that exceeds the capacity of adjustment of the affected community." Additionally, United Nation Office for Disaster Risk Reduction(UNISDR): defines disasters as " A serious disruption of the functioning of a community or society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. Disasters are characteristically subdivided into natural disasters (acts of nature) and human-generated or "anthropogenic" disasters. Some disasters have prominent natural and anthropogenic elements combined, leading to their description as "hybrid" disasters. Upon updating and formulating the National Strategy for Disaster Risk Reduction (NSDRR), the Egyptian government focused on the international approaches in this area, most important of which include the Sendai Framework (2015 – 2030) adopted in March 2015 in the 3rd UN World Conference for DRR; the UN Sustainable Development Agenda (2015 – 2030) approved during the UN Summit in September 2015 (WHO 2007 & Badawi etal 2017). In the context of the recent national developments as well as regional and international obligations, Egypt issued the NSDRR 2030 in order to fulfill these obligations and to upgrade its current national system for disaster risk reduction. Towards that end, the Egyptian government took a number of relevant measures and steps, including the preparation of the National Strategy for Crisis/Disaster Management and Disaster Risk Reduction (Badawi etal 2017).

Each year, schools all over the world suffer from disasters, ranging from small to large damaging ones that affect children safety and health. A total of 9,655 people were killed and 124.5 million people become victims worldwide. In 2016, about 342 natural disasters caused 8,733 deaths and affected 569.4 million people worldwide. In the same year, 108 countries and territories were hit by disasters (proulx and aboud 2019). In Egypt, the Health Insurance Agency at 2009 stated that during school hours approximately 13,000 injuries occurring in school playgrounds yearly in the Egyptian schools. In 2014, Torrents caused a great damage inside schools especially in South of Delta Governorates of Asuit, Aswan, Sohagand Kana leading to the closure of schools for week and death of seven students inside their schools. Egyptian Afack newspaper in 2014 reported that explosion in a preparatory school's laboratory caused 25 injured cases among students (Hegazy, Shounoda and Ismail 2014) .

Disaster Risk Reduction (DRR) is a systematic approach to identifying, assessing and reducing that risk. Specifically, the purpose of disaster risk reduction is to minimize vulnerabilities and disaster risks throughout a society in order to avoid (prevent) or to limit (mitigate and prepare for) the adverse impacts of natural hazards, and facilitate sustainable development (UNICEF 2009).

School safety require a dynamic, continuous process initiated by management emphasis multi-disciplinary approach and involving workers, students, parents as well as the local community. School disaster management involves the familiar cycle of steps found in all project management: assess hazards, vulnerabilities, capacities and resources; plan and implement for

physical risk reduction, maintenance of safe facilities, standard operating procedures and training for disaster response; test mitigation and preparedness plans and skills regularly, with realistic simulation drills; and revise the plan based on the previous experience. School disaster management mirrors individual and family disaster prevention, and wider community disaster prevention efforts (asean 2012).

Disaster Risk Reduction program enabling the school children to be positive change makers in their communities. The prominent literature in this field consists of reports and case studies produced by child-focused Non-Governmental Organizations (NGOs) for example, UNISDR and Plan International (2012) documented stories made by children in Asian countries illustrating children's role in addressing disaster risk and the impact of climate change and advocating for governments, NGOs and private sectors to promote Disaster Risk Reduction (Amri, Haynes, Bird and Ronan 2017).

Moreover, Students are an excellent medium to reach the parents. Messages on emergency evacuation mock drill, building emergency response capacity, search and rescue, fire safety, first aid and preparing disaster management plan for the school etc. can be conveyed through the children to their parents and to the society at large. Students' safety extends from the classroom to all schools and students transfers this knowledge to parents in the home. This information kept to students and grows up and used in the future. Safety begins with teachers and every school responsible staff who can only protect students which need a physically, mentally and emotionally mature staff member. Positive attitude, behavior, response in an organization is needed for competent, efficient and well organized plan for preparing for future emergencies and disasters (SOPAC 2007).

Qualified trainer must predict any risk or hazards' and can protect other for commonly occurring emergencies in schools. Provide health education programs in schools is eligible to prevent health related problems, which participate in children and community's wellness. The behavior and response of people and the community to disaster is very paramount in the planning of emergencies and disaster, as well as the collaboration and teamwork in handling the "after shock" of these disasters for a vigorous and efficient recovery (FEMA2011).

Disaster nurses play key leadership and service provision roles in planning and implementing disaster relief efforts, preventing technologic disasters, and addressing problems that occur during a disaster, such as the physical and emotional stress of disaster victims. During a disaster many environmental health problems emerge. The scope and magnitude of these problems determines the nursing role. Nurses collaborate with community agencies and officials to recognize and reduce disaster risks and maximize the health and safety of individuals involved in disaster crises (Millet 2013).

The school nurse is a vital school professional who is knowledgeable of the physical and emotional needs of the students served by the school. School nurse is important for the school crisis team to optimize positive outcomes in all phases of emergency management. School administrators should ensure that the school nurse pursue professional development, as needed, to address skills related to emergencies with an emphasis on planning, performing triage,

providing emergency care and promoting a positive recovery phase for the school and community (NASN 2016). The school nurse is in a leadership position to provide continuous integration, coordination, and training of all school and community members as a part of the school's emergency management plan (Tuck, Haynie, and Davis. 2014). So that the current study aims to develop a disaster risk reduction guideline for governmental primary schools students and to assess the effect of applying developed disaster risk reduction guideline on safety behavior of governmental primary schools student in Alexandria.

Aims of the study
The current study aims to:

- Develop a disaster risk reduction guideline for governmental primary schools students.
- Assess the effect of applying developed disaster risk reduction guideline on safety behavior of governmental primary schools students.

Research hypothesis:

- The application of the disaster risk reduction guideline positively affects the governmental primary schools students' safety behavior.

II. Materials & Method

Materials
Design:-A Quasi –experimental study design was used to carry out this study.
Setting: -The study was carried out at four governmental primary schools in Alexandria. Alexandria Governorate is divided into eight educational zones affiliated to the Ministry of Education. Two out of the eight zones were selected as they had the largest number and density of primary schools students namely (El-Montazah and East zones). One class (5th grade) from each of the selected schools were randomly chosen (4 classes).
Subjects: - All students in the previously selected classes were included in the study they 200 primary school students and 35 academic and field experts including: five academic experts, five experts from the safety and occupational health field, the directors and the disaster committee members from the four selected schools (25 members) who accepted to participate in the study were included.
Tools: -In order to collect the necessary data for this study, the following tools were used.
Tool I:- Primary school students' disaster knowledge questionnaire:

It was developed by researchers after reviewing the recent literature to collect necessary data from the students and include the following parts: **part one:** Primary school students' disaster and safety measures related knowledge: regarding disasters and safety measures such as: Definition of disaster (types, stages), disaster committee (disaster committee team and student's roles in the committee) , plan for evacuation (present of the plan, familiar evacuation plan and previous emergency drills training) , students' knowledge about fire and its management (fire theory, types of fire, safety measures and types of fire extinguisher), students' knowledge about first aid (injuries, bleeding, fracture and poising). The knowledge level was categorized according to experts' opinion into poor (less than 50%), fair (50% to less than 75%) and good knowledge (75% and more). **Part two**: socio-demographic characteristics of the students and

their families: such as age, sex, place of residence, crowding index, parent's educational level and occupation, family' income and its sufficiency.

Tool (II): Disaster risk reduction observation checklist:

The checklist was developed by the researcher after reviewing literatures to assess student behavior pre and post scenario application. It includes items like: observation of the students during evacuation drill, use of fire extinguisher and first aid through simulation in the school environment. It was scored by awarding one point for each safe behavior and zero for unsafe behavior. The student behavior level was categorized according to experts' opinion into poor (less than 50%), fair (50% to less than 75%) and good or safe behavior (75% and more).

Tool III: Guideline revision and evaluation of internal validation "AGREE II Instrument" Developed at 2009 by Brouwers M, Kho ME, Browman GP, Cluzeau F, feder G, Fervers B, Hanna S, Makarski J and updated at 2013 on behalf of the AGREE Next Steps Consortium. It was used to measure the content validity, reliability, and applicability of the final guideline recommendations and format. The "AGREE Instrument" consists of 23 key items organized within 6 domains followed by 2 global rating items "overall assessment". Each domain captures a unique dimension of guideline quality as the following:

- **Domain 1:** Scope and Purpose is concerned with the overall aim of the guideline, the specific health questions, and the target population (items 1-3).
- **Domain 2:** Stakeholder Involvement focuses on the extent to which the guideline was developed by the appropriate stakeholders and represents the views of its intended users (items 4-6).
- **Domain 3:** Rigour of Development relates to the process used to gather and synthesize the evidence, the methods to formulate the recommendations, and to update them (items 7-14).
- **Domain 4:** Clarity of Presentation deals with the language, structure, and format of the guideline (items 15-17).
- **Domain 5:** Applicability pertains to the likely barriers and facilitators to implementation, strategies to improve uptake, and resource implications of applying the guideline (items 18-21).
- **Domain 6:** Editorial Independence is concerned with the formulation of recommendations not being unduly biased with competing interests (items 22-23).

Each of the 23 items and the 2 global items are rated on a 7- point scale (1 strongly disagree to 7 strongly agree).

- **Score of 1 (Strongly Disagree).** A score of 1 should be given when there is no information that is relevant to the AGREE II item or if the concept is very poorly reported.
- **Score of 7 (Strongly Agree).** A score of 7 should be given if the quality of reporting is exceptional and where the full criteria and considerations articulated in the User's Manual have been met.

- **Scores between 2 and 6.** A score between 2 and 6 is assigned when the reporting of the AGREE II item does not meet the full criteria or considerations. A score is assigned depending on the completeness and quality of reporting. Scores increase as more criteria are met and considerations addressed.
- Domain scores are calculated by summing up all the scores of the individual items in a domain and by scaling the total as a percentage of the maximum possible score for that domain.
- Maximum possible score = 7 (strongly agree) x No of items per domain x No. of appraisers.
- Minimum possible score = 1 (strongly disagree) x No of items per domain x No. of appraisers.
- Scaled domain score = Obtained score – Minimum possible score /Maximum possible score – Minimum possible score.
- The six domain scores are independent and should not be aggregated into a single quality score
- The Consortium has not set minimum domain scores or patterns of scores across domains to differentiate between high quality and poor quality guidelines. These decisions should be made by the user and guided by the context in which AGREE II is being used.

Method:

- An official letter from the Faculty of Nursing/ Alexandria University was directed to the Education directorates in Alexandria to seek permission to carry out the study in the different selected settings after explaining the purpose of the study.
- An approval of the director of each school included in the study to inform them about the Education directorates' approval and seek their cooperation. The director of each school was informed about the date and time of data collection.
- The nature and aim of the study was fully explained to the study participants. The selected class to participate in the study were preceded the questionnaire included a written description of the purpose and nature of the study.
- The Primary school students' disaster knowledge questionnaire and Disaster risk reduction observation checklist (I & II) were developed by the researcher after reviewing of relevant and recent literature.
- Tool (I) & (II) were tested using Content Validity Index (CVI)by exposing it to a group of 5 experts in the field.
- Content validity of the study tools was tested by exposing it to a group of experts 'comments (jury) 5 experts in the field of community health nursing.
- Too (III) was used by the experts (35 experts) to measure the content validity, reliability, and applicability of the final guideline.
- Internal consistency reliability (coefficient alpha) was applied to test reliability of tool (I), it was 0.81.

Pilot study

- After the development of tools, a pilot study was carried out on a sample of (20) students from El-Nozha boys school in East educational zone, who was not be included in the study sample to ascertain the clarity and applicability and wording of the tools, according to their response the tools was modified.
- The purpose of the pilot study was to ensure the clarity of items and their comprehension, applicability and relevance of the tools, in addition to identify obstacles and problems that may be occurring during data collection. Also, to test wording of questions and estimate the time that required to complete the instruments.
- Data obtained from the pilot study were analyzed and according to the results the tools was evident that the statements of the instruments were clear and relevant and no changes or modifications were done.
- It was also found that the time needed to complete it ranged between 40 to 45minutes.

Actual field work:

- After the Disaster risk reduction guideline and validated was developed the training program actually carried out on 200 primary school students during the period from February 2018 to may 2018. It consisted of 3 phases:

Phase I : Preparatory phase:-

Stage 1:- Initial data collection: Pre-test were conducted by using tool (I) and tool (II) to assess the students' disaster management and safety related knowledge and behavior .

Stage 2: Developing guideline:

- Stating clear general objective "At the end of the DRR training program the primary school student's knowledge and practice regarding to disaster and crises management will be improved."
- Specific objectives:
  - Identify the definition, phases and types of disaster.
  - Differentiate standardize disaster colors.
  - Differentiate between roles of disaster committee.
  - Clarify the emergency numbers.
  - Apply safe behave in earthquake and flood.
  - Re-demonstrate evacuation drill.
  - Identify fire triangle theory and types of fire tools.
  - Demonstrate smock evacuation and someone attached fire.
  - Clarify types of fire extinguisher.
  - Apply safety use of fire extinguisher.
  - Define meaning of first aid and content of the first aid bag.
  - Apply correct first aid measures for the different situation.
- The guideline was developed based on the current literature and the results of the preparatory phase (pre-test). The program steps and methodology was planned to

students. The training program aimed to enhance the knowledge and practice of primary school students.

Stage 3- Guideline Revision and Evaluation of Internal Validation:-

- Drafts of the developed guideline were circulated to the group of experts for revision before its application. To measure the content validity, reliability and its applicability of the final guidelines recommendations and format by utilizing "AGREE II Instrument" (tool III).
- The Guideline was appraised by 35 experts as follow: five academic experts(5 from community health nursing department) , five experts in safety and occupational health field (two expert from Institute of Public Health and two expert from Institute of Studies & Scientific Research and one in community medicine department), the directors and the disaster committee members from the four selected schools (six from Abbas El Akkad, seven from El Shaheed Walid Sobhi, six from mandara school and six from Fahmy gabr school)
- Any specific instructions and comments from expert's revision was documented and considered in the formulation of the final guideline booklet and feedback from their revision was used after modified it.
- Preparation of media used in the training program as printed materials were developed by the researchers in order to enhancing the student's memorization about the meaning of different type of disaster, fire extinguishers and first aid measures.
- Select suitable videos regarding types of disaster, Power point, coloring activities and role playing was developed by the researcher to facilitate the concepts clarifications.
- Preparation of the schools environment for conducting the training program:

Phase II : Implementation phase:

- This phase included the implementation of the planned training DRR program's sessions according to the following; The researcher was introduce himself to the school students, and ask them to share one little known fact about themselves (Ice breaking process).
- The DRR training program was implemented for the students with assistance by teacher in the form of nine sessions, one session/week , each session takes around 90 minutes and it was include the following:

The first session included: Introduction and definition of disaster; Types of disaster (natural, man-made and mixed disasters), Stages of disaster (pre, during and post disaster); and Know different colors that indicate in emergency situations.

The second session included: Define Emergency numbers; and Disaster committee team and his roles.

Third Session included: Meaning of school emergency plan, Emergency drill in cases if present inside the school building or outside the school building; and Role of students in cases of earthquake (during and after), Heavy rain and Bombs.

Fourth Session included: Explain evacuation plan from the class to the assembly point; Demonstration of emergency drill from the class to the assembly point.

Fifth Session included: Fire basic knowledge (theory, material and fire extinguisher).

Sixth Session included: Colors the Fire extinguisher parties, Role of students in cases of Fire attached one of your colleagues; and Role of students in cases of your class filled with smoke.

Seventh Session included: Know fire extinguisher parties, Fire extinguisher use and precaution; and Differentiate types of fire extinguisher.

Eighth Session included: Meaning of first aid, Content first aid bag, Apply first aid measure in cases of bleeding or injuries, fracture, poising and burn.

Ninth Session included: Re- demonstration for all practices as evacuation drill, earthquake and use of fire extinguisher, Critique some malpractice for disaster management behavior, All students in the class (50 students) were included in each session. Each session was take 45 minutes (the period of the school session), to cover all theoretical contents and another 45minutes for practice, The researcher was use different teaching methods as demonstration and discussion, drawing and coloring activities, video, role play, learning aids as handout and pictures; and Revision before each session and give reward to correct answer, at end of the session repeat the main point and ask questions.

Phase III: Evaluation phase:

- Disaster risk reduction observation checklist evaluates student behavior post DRR scenario application. It was include items as: observation of the students during evacuation drill, use of fire extinguisher and first aid through simulation in the school environment.
- The evaluation phase was done immediately and after four months follow-up to determine the effect of the disaster risk reduction guideline on primary school students' disaster safety knowledge and behavior using tool (I) and tool (II).

Ethical considerations:

- Prior to data collection; research consent form was given to the director of each school in order to assume protection of human rights of the study subjects.
- Written informed consent was obtained from the study subjects after explanation of the aim of the study.

Statistical analysis:

- The collected data were coded and analyzed using PC with the Statistical Package for Social Sciences (SPSS version 20) and tabulated frequency and percentages were calculated.
- Count and percentage: Used for describing and summarizing quantitative data.
- Minimum, Maximum, Arithmetic mean ($\overline{X}$), Standard deviation (SD), they were used as measures of central tendency and dispersion respectively for normally distributed quantitative data.
- Friedman's test, ANOVA with Cochran's Q, Pearson's R, and Paired t-test were carried out in calculating the difference of disaster, fire, first aids and healthful school environment

knowledge scores and observation scores among the study sample. The significance of association (p) was accepted as statistically significance at an alpha level of ≤ 0.05.

III.Results

Table (I): Distribution Of The Studied Students According To Their Socio–demographic Characteristics

Characteristics	Total (N=200)	
	No.	%
Age (years)		
- 10-	25	12.5
- 11-	93	46.5
- 12-13	82	41.0
Min. – Max.	10.0 – 13.0	
Mean ± SD.	11.33 ± 0.7	
Sex		
- Female	116	58.0
- Male	84	42.0
Income sufficiency		
- Sufficient	115	57.5
- Insufficient	8	4.0
- Don’t know	77	38.5

Table (I) shows the distribution of the studied students according to their socio-demographic characteristics. The table illustrate that the age distribution of the studied students ranged from 10 to 13 years. Girl students represented more than half (58.0%) of the studied students. Concerning families' income, more than half (57.5%) of the studied students declared that their family's income is sufficient, compared to only (4.0%) who stated that their family's income is insufficient.

Table (II): Distribution Of The Studied Students According To Their Knowledge Regarding the Main Dimensions Of Disaster Pre and Post The Disaster Risk Reduction Guideline Application.

Main Dimensions Of Disaster	Total (N= 200)					
	Pre		Post 1		Post 2	
	No.	%	No.	%	No.	%
Total overview about disasters related knowledge						
- Poor	135	67.5	0	0.0	6	3.0
- Fair	61	30.5	10	5.0	37	18.5
- Good	4	2.0	190	95.0	157	78.5
Friedman X^2	X^{2a}= 349.96 P= 0.000*		X^{2b}=269.29 P= 0.000*		X^{2c}= 24.649 P= 0.000*	
X^2	X^2= 452.058				P = 0.000*	
Total emergency plan related knowledge						
- Poor	193	96.5	0	0.0	4	2.0
- Fair	7	3.5	13	6.5	25	12.5
- Good	0	0.0	187	93.5	171	85.5
Friedman X^2	X^{2a}= 381.8 P= 0.000*		X^{2b}=362.45 P= 0.000*		X^{2c}= 8.501 P= 0.014*	
X^2	X^2= 561.760				P = 0.000*	
Total fire related knowledge						
- Poor	200	100.0	2	1.0	6	3.0
- Fair	0	0.0	24	12.0	50	25.0
- Good	0	0.0	174	87.0	144	72.0
Friedman X^2	X^{2a}= 392.08 P= 0.000*		X^{2b}=376.69P= 0.000*		X^{2c}= 13.96 P= 0.001*	
X^2	X^2= 583.448				P = 0.000*	
Total overview of first aids related knowledge						
- Poor	194	97.0	1	0.5	5	2.5
- Fair	6	3.0	30	15.0	54	27.0
- Good	0	0.0	169	84.5	141	70.5
Friedman X^2	X^{2a}= 376.02 P=		X^{2b}= 358.90 P=		X^{2c}= 12.053 P=	

	0.000*		0.000*		0.002*	
X^2	X^2= 562.124				P = 0.000*	
Total management of specific situations related knowledge						
- Poor	200	100.0	6	3.0	7	3.5
- Fair	0	0.0	28	14.0	47	23.5
- Good	0	0.0	166	83.0	146	73.0
Friedman X^2	X^{2a}= 376.69 P= 0.000*		X^{2b}=372.95 P= 0.000*		X^{2c}=6.172 P= 0.046*	
X^2	X^2= 554.221				P = 0.000*	
Healthful school environment related knowledge						
- Poor	142	71.0	52	26.0	33	16.5
- Fair	33	16.5	24	12.0	34	17.0
- Good	25	12.5	124	62.0	133	66.5
Friedman X^2	X^{2a}= 108.95 P= 0.000*		X^{2b}=141.73P= 0.000*		X^{2c}=6.286 P= 0.043*	
X^2	X^2=168.017				P = 0.000*	
School disaster's committee related knowledge						
- Poor	136	68.0	17	8.5	27	13.5
- Fair	29	14.5	9	4.5	10	5.0
- Good	35	17.5	174	87.0	163	81.5
Friedman X^2	X^{2a}= 108.95 P= 0.000*		X^{2b}=141.73P= 0.000*		X^{2c}= 6.286 P= 0.043*	
X^2	X^2= 257.415				P = 0.000*	
Total knowledge level						
- Poor	200	100.0	1	0.5	3	1.5
- Fair	0	0.0	46	23.0	69	34.5
- Good	0	0.0	153	76.5	128	64.0
Friedman X^2	X^{2a}= 396.02 P= 0.000*		X^{2b}=388.18 P= 0.000*		X^{2c}= 7.824 P= 0.020*	
X^2	X^2= 592.619				P = 0.000*	

Table (II): represent the main dimension of disaster for the studied students according to their knowledge pre and post the disaster risk reduction guideline application.

Regarding the studied student's knowledge regarding the total overview about disasters, it was observed that 67.5% of the studied students had poor knowledge in the pre-guideline use phase. As regard to the total emergency plan, it was observed that the majority (96.5%) of the studied students had poor knowledge in the pre-guideline use phase.

Concerning to the student's knowledge regarding total fire, it was observed that the all of the studied students had poor knowledge during the pre-guideline use phase. Furthermore, in the pre-guideline phase, the vast majority (97.0%)of the studied students had poor knowledge regarding total overview of first aids.

The table also highlights the total management of specific situations knowledge of the studied students; in the pre-guideline use phase it was observed that the all of the studied students had poor knowledge. Concerning to the student's knowledge regarding healthful school environment, it was observed that the more than two thirds (71.0%) of the studied students had poor knowledge during the pre-guideline use phase. As regard to the school disaster's committee, it was observed that more than two thirds (68.0%) of the studied students had poor knowledge in the pre-guideline use phase.

Lastly, it can be observed from the total knowledge level among the studied students that all had poor knowledge during the pre-guideline use phase with improved knowledge to 76.5.0% in the post1 implementation phase.

Table (III): Distribution Of The Studied Students According To The Main Dimensions Practices Regarding Disaster Pre and Post The Disaster Risk Reduction Guideline Application.

Disaster practice	Total (N= 200)					
	Pre		Post 1		Post 2	
	No.	%	No.	%	No.	%
Evacuation						
- Poor	20 0	100.0	18	9.0	20	10.0
- Fair	0	0.0	5	2.5	56	28.0
- Good	0	0.0	177	88.5	124	62.0
Friedman X^2	X^{2a}= 333.94 P= 0.000*		X^{2b}= 327.27 P= 0.000*		X^{2c}= 52.077 P= 0.000*	
X^2	X^2= 534.29		P = 0.000*			
Use of fire extinguisher						
- Poor	20 0	100.0	19	9.5	16	8.0
- Fair	0	0.0	0	0.0	10	5.0
- Good	0	0.0	181	90.5	174	87.0
Friedman X^2	X^{2a}= 330.59 P= 0.000*		X^{2b}= 340.74 P= 0.000*		X^{2c}= 10.39 P= 0.014*	
X^2	X^2= 481.22		P = 0.000*			
Fire management						
- Poor	20 0	100.0	19	9.5	9	4.5
- Fair	0	0.0	0	0.0	4	2.0
- Good	0	0.0	181	90.5	187	93.5
Friedman X^2	X^{2a}= 330.59 P= 0.000*		X^{2b}= 365.55 P= 0.000*		X^{2c}= 7.669 P= 0.022*	
X^2	X^2= 583.448		P = 0.000*			
Management of rescues						
- Poor	20 0	100.0	19	9.5	4	2.0
- Fair	0	0.0	0	0.0	19	9.5
- Good	0	0.0	181	90.5	177	88.5
Friedman X^2	X^{2a}= 330.59 P= 0.000*		X^{2b}= 384.31 P= 0.000*		X^{2c}= 28.827 P= 0.000*	
X^2	X^2= 537.255		P = 0.000*			
Total Practice level						
- Poor	20 0	100.0	19	9.5	15	7.5
- Fair	0	0.0	7	3.5	23	11.5
- Good	0	0.0	174	87.0	162	81.0
Friedman X^2	X^{2a}= 330.59 P= 0.000*		X^{2b}= 344.18 P= 0.000*		X^{2c}= 9.433 P= 0.009*	
X^2	X^2= 482.78		P = 0.000*			

Table (III): illustrates the distribution main dimensions of the studied students according to their practice regarding disaster pre and post the disaster risk reduction guideline application. Regarding the studied student's practice regarding the evacuation, it was observed that all of studied student's had poor behavior in the pre-guideline use phase. As Regard to the use of fire extinguisher, it was observed that the all of the studied students had poor behavior in the pre-guideline use phase compared 90.5% had good behavior in the post 1guideline implementation phase.

Furthermore, in the pre-guideline use phase, all of the studied students had poor behavior regarding fire management, compared to the majority (90.5%) who had good behavior in the post1 guideline implement phase. Concerning to the student's practice regarding management of rescues, it was observed that all of the studied students had poor behavior during the pre-guideline use phase.

Likewise, it can be observed from the total practice level among the studied students that the all had poor behavior during pre-guideline phase with improved performance to 87.0% in the post1 guideline implementation phase whereas, there is a slight decrease performance to 81.0% in the post 2 guideline implementation phase.

Table (IV): The Comparison Between The Studied Students' Knowledge and Their Age and Sex Across Post 1 and Post 2 Guideline Application Phase:

Items	Disaster 's knowledge POST 1				Disaster 's knowledge POST 2			
	Poor	Fair	Good	Chi square test	Poor	Fair	Good	Chi square test
	%	%	%		%	%	%	
Age								
- 10	0.0	24.0	76.0	χ^2 = 2.472 P= 0.872	0.0	40.0	60.0	χ^2= 7.015 P=0.319
- 11	1.1	19.4	79.6		2.2	28.0	69.9	
- 12	0.0	27.0	73.0		1.4	43.2	55.4	
- 13	0.0	25.0	75.0		0.0	12.5	87.5	
Sex								
- Male	0.0	32.1	67.9	χ^2= 7.402 P=0.025 *	2.4	45.2	52.4	χ^2= 8.649 P=0.013 *
- Female	0.9	16.4	82.8		0.9	26.7	72.4	

*: Statistically significant at p ≤ 0.05

Table (IV) portrays the comparison between the studied students' knowledge and their age and sex across post 1 and post 2 guideline application phase. In the post1 guideline implementation phase, the table reveals extremely response to guideline implementation among the studied students age group. No significant differences were observed about to disasters knowledge across the studied student's age groups in the post1 and post 2 implementation guideline phases (χ^2 = 2.472 P= 0.872, χ^2= 7.015 P=0.319, respectively). Additionally, table (IV) reveals that significant differences were observed about to disasters knowledge across the studied student's sex in the post1 and post 2 implementation guideline phases (χ^2 = 7.402 P= 0.025, χ^2= 8.649 P=0.013, respectively).

Table (V): Comparison Matrix Between The Studied Students' Total Knowledge Score and Total Practice Score Regarding Disaster Across The Guideline application Phases.

		Knowledge (Pre)	Knowledge (Post1)	Knowledge (Post 2)	Practice (Pre)	Practice (Post1)	Practice (Post2)
Knowledge (Pre)	**R**						
	P						
Knowledge (Post1)	**R**	0.111					
	P	0.117					
Knowledge (Post 2)	**R**	0.056	**0.386**				
	P	0.431	**0.000***				
Practice (Pre)	**R**	0.005	0.127	0.117			
	P	0.946	0.074	0.098			
Practice (Post1)	**R**	0.001	0.108	**0.192**	0.006		
	P	0.987	0.128	**0.006***	0.929		
Practice (Post2)	**R**	0.047	0.105	**0.222**	0.003	**0.840**	
	P	0.510	0.138	**0.002***	0.963	**0.000***	

r = Pearson's R
* Significant at $p \leq 0.05$

Table (V): shows the comparison matrix between the studied students' total knowledge score and total practice score regarding disaster across the guideline application phases. The result reveals that there were significant differences between the total score of the studied students' knowledge and practice regarding disaster across the guideline implementation phases.

The results also indicates that there were no statistically significant differences were observed between the studied students' total knowledge score and total practice score regarding disaster across the knowledge post1phase and pre practice guideline use (r = 0.111, 0.005, 0.127, 0.117, p = 0.117, 0.946, 0.074, 0.098, respectively).

Table (VI): The Distribution Of Experts In The Field Regarding Guideline Revision and Evaluation of Internal Validation AGREE II Instrument.

Guideline domain	Total (N= 35)		
	Maximum score	Minimum score	Scaled domain score
Domain 1 # (3)	735	105	91.43%
Domain 2 #(3)	735	105	90.0%
Domain 3 #(8)	1960	280	90.77%
Domain 4 #(3)	735	105	91.11%
Domain 5 #(4)	245	35	90.95%
Total agree #(21)	4410	630	90.82%
Recommended guideline use	**No.**	**%**	
- **Yes**	30	85.7%	
- **Yes with modification**	5	14.3%	

Table (VI) portrays the distribution of experts in the field regarding guideline revision and evaluation of internal validation.

As regard the expert feedback in the field to guideline use, only 14.3% of the appraisers stated that there was need to modification, on the other hand, the majority (85.7%) of them received the highest score for the guideline to use .

Concerning of the disaster risk reduction guideline, overall calculation was performed for each domain. It was used to assess the overall quality of the disaster risk reduction guideline. Overall, the highest score 90.82% among five domains evaluated by the AGREE II, the max and min score were (max=4410 min=630) had high score of quality in the guideline use.

Table (VII): Distribution Of The Experts In The Field To Content Validity Index (CVI) Data Regarding The Disaster Risk Reduction Guideline.

Items	Total (N= 35)				Total score
	Relevance	Clarity	Simplicity	No Ambiguity	
Academic Expert	3/5	3/5	3/5	3/5	12/20
Safety and occupational health field	5/5	4/5	5/5	3/5	17/20
Directors and disaster committee members	25/25	25/25	25/25	25/25	100/100
Score content validity index (CVI)					129/140 0.921

Table (VII) illustrate the distribution of the experts in the field to content validity index data regarding the disaster risk reduction guideline.

The result reveals validity of the disaster risk reduction guideline to implementation (overall score from each evaluator was 129 an average content validity index of the 0.921 was obtained. This index indicated that guideline were relevant and clear.

IV. Discussion

Primary school children constitute a major category of the total population in Egypt and they are at risk for different problems. Injury is a common cause of morbidity and mortality in children due to lack of experience. Primary schools are most likely to be vulnerable to safety threats. This is because the majority of learners at primary schools are at an age where they are physically weak, unable to deal with dangerous situations effectively; furthermore, physical injuries are worse among them as they are still growing; additionally, emotional hurts do more damage to them since their emotions flare up intensely and are less grounded; and they are reckless due to their immaturity (UNICEF 2012).

Results of the present study indicated that all studied students age ranged from 10 to 13 years and girl students represented more than half of the studied students (**table I).** These findings were congruent with **Elewa and Saad (2018)** they reported that more than half of

studied students were girls. Additionally, the current study focused on the higher grade students (fifth & six), in since, these students have reached a certain level of maturity and they would be able to grasp the knowledge and learn new skills more quickly and retain it in their memory, and can apply these skills later in their life. Additionally, **Stough, Kang and lee (2018)** The international Sendai Framework for Disaster Risk Reduction policy recognizes that the children across the world as disproportionately vulnerable to disaster**.** Such vulnerability is related to the unique physical, psychological, and cognitive characteristics of these children during the developmental period. Children relatively have less strength and physical hardiness, which making them more vulnerable to the effects of disasters and public health emergencies. Children's bodies are also smaller and more fragile than adult bodies which make them more susceptible to injuries. Younger children are less likely to escape from disaster as they run slower and often have limited physical skills due to their panic in this new situation and cannot deal effectively (**save the children 2015**).

Stough etal (2018) found that children must be knowledgeable about emergency procedures, particularly evacuation procedures, so that they are not completely reliant on teachers for emergency instructions. Teachers and school personnel are at risk of dying or becoming incapacitated during school disasters. The more knowledgeable students are about taking evasive action, the more independently they can respond in these situations. For example, as seen in the Great Japan disaster, older students at the school assisted younger students in evacuating. Disaster practices and policy also can be strengthened by the input of students. Like teachers, children inhabit their classrooms and schools on a daily basis and may have observations and ideas to share which can improve emergency procedures. Allowing schoolchildren to be undertrained and passive actors in disaster contributes to their vulnerability in disaster. Conversely, increasing student knowledge and agency is likely to decrease vulnerability to disasters.

Encouraging children to think about the importance of preventive measures and preparedness can bridge the gap between knowing and acting on knowledge. Today's, disaster education should be explicitly addressed as a way to improve the level of child resiliency and information transmission to reduce the risk of disasters in their homes (**Torani, Majd, Maroufi, Dowlati and Sheikhi 2019**). Furthermore, the current results are supported by Sendai Framework for Disaster Risk Reduction / SFDRR (2015-2030) in Priority for Action which emphasizes the importance to strengthen preparedness to deal with disasters (**UNISDR 2016-2019**).

Millions of people including children have died and become homeless and or displaced due to lack of knowledge about disasters, emergency preparedness and disaster risk reduction. In this context Disaster Risk Reduction (DRR) prevention and mitigation plays an important role (**ECHO 2013**). The current results showed that is all studied students had poor disaster related practice in the pre-guideline phase and it is significant improved in the performance practice score of disaster after the application of the guideline sessions **(table III)**. Constantly, **Andespa and Fauzi (2019**) found that, children attending disaster mitigation training at an early age are able to understand the process of disaster mitigation and its implementation so that if one day the children face disasters can survive and stay alive.

Nandi and Marlyono (2019) added that, in Japan for the victims of school-age children under 20 years old is 6% of the total number of fatalities, while the number of victims in the Indian Ocean reached 44.6% for school-age children under 20 years old. This could be explanted that Japan has been quite successful implanting of disaster preparedness on learners, reflected by the small number of deaths in school-age children.

Moreover, the study showed no statistical significant association between knowledge and studied student's age groups in the post1 and post 2 implementation guideline phases (**table IV**). This may be attributed to that this age group its did not have previous experience with DRR in their educational curriculum. Since these findings were similar to **Petal (2017) and Stough, lee, kang (2018),** who mentioned that "most of the educational efforts directed towards the public and children have neither been systematically conceived nor tested, nor has their impact been scientifically evaluated" thus, little is known about the effectiveness of such programs. Disaster risk reduction was rarely taught as a primary focus within the school curriculum.
The present study showed that, guideline implementation was more effective among girls than boys **(table I**). Where only, 0.9% had poor knowledge in the post1 implementation phase concerning to the students knowledge regarding disasters, it was observed that around three quarters of the girls and boys had good knowledge since, they gain more knowledge sore than boys in both in the post1 implementation phase. Concerning the gender, the results indicated that significant differences between gender and disasters knowledge of the studied students in the post1 and post 2 implementation guideline phases. This may be due to the girl students as one of the tools used in DRR program implementation prefer drawing and coloring activities. Current finding were in same line with study done by **Sinha, Pal, Kasar, Tiwari and Sharma (2008)** who found that the mean score was slightly higher in females.

Conducting simulations and drills is the most effective way to evaluate and test disaster preparedness plans; these exercises are used widely by organizations and educational institutions in disaster response (**PAHO 2011**). Drills and simulations are also excellent tools for training, and for assessing decision making processes, teamwork, and coordination. Consequently, simulation exercises play an important role in promoting a culture of disaster risk reduction including enhanced preparedness for effective response, as called for by the Sendai Framework for Disaster Risk Reduction **(PAHO & WHO 2011)**. The simulations help prepare students and allow for stress testing plans and systems. Challenges faced during a crisis, ranging from coordination and security to administrative and technical difficulties can be reduced by regular exercises (**UNDRR 2020**). For these reasons the current study used this technique.

First aid is most urgent need to stabilize victim condition before any kind of intervention is sought (**IFRC 2016**). The present study reveals that all of studied students had poor knowledge about first aid measures during pre guideline application use phase (**table II**). These may be due to lack of participation in Red Cross committee. Results were support the study done by **Abo Elsoud, Ahmed and Farg (2018)** where most of the studied children did not attend any previous training program on first aid. The current study findings may reflect the lack of effective, formal emergency care training in student's preparation programs coupled with no continuing education requirement in a possible explanation of these results.

Overall, total practice level among the studied students the present results showed that all of them had poor behavior during pre-guideline phase with improved performance to 87.0% in the post1 guideline implementation phase whereas, there is a slight decrease performance to 81.0% in the post 2 guideline implementation phase (**table III**) . This result was support **Taghizadeh, Mowafi and Ardalan (2013), Hosseini and Izadkhah (2020)** as they found that, many students applied the knowledge gained in such drills at the time of the disasters to protect themselves, but still many of them who knew the right measures could not implement the proper behavior. Also, this research mentions that their implementing annual drill once in a year is not sufficient and further practices should be organized by the schools to mainstream appropriate and in-time behaviors. Also, the current results go in line with the study conducted **Alrazeeni (2015)** as who found that**,** lacked the required knowledge and skills to provide optimal emergency management and disaster response. Students reported weak to moderate levels of disaster preparedness (knowledge and skills) which enclose inadequacy of students' abilities to participate in disastrous events. Additionally, these results are similar to findings of **Victoria., Johnson, Towers and Petal (2018)** they had reported the students training may provide important and necessary learning opportunities, it is not clear whether they improve children's situational awareness and decision-making skills (**Johnson et al., 2014**). Improved situational awareness, mastery of response skills, realistic simulation scenarios, practice in decision-making, increased school accountability self-assessments, and 'after-action reviews' to stimulate improvements in school disaster management (**Ferrer et al., 2009**).

The most encouraging findings from the current study present that, after the application of the disaster risk reduction guideline sessions, their high performance practice score among the studied students, they had ability to successfully perform the safe behavior as observed by the researcher and reported by their teacher. These findings shed the light on the importance of integrate the DRR guideline into the curriculum in order to make sure that these skills are confirmed and sustainable which also, confirmed by study done in New Zealand's. In New Zealand's many schools already voluntarily conduct drills for disasters and found that successful national disaster education program for children in New Zealand **(Johnson 2014)**. So, we can recommend that application of this idea.

Disaster Risk Reduction (DRR) enhances the capacities of students of all ages to actively contribute to DRR initiatives in their schools. Drawing from past disaster experiences, risk awareness is enhanced through the development of practical skills and routine disaster education at school in order to take actions when a disaster strikes **(Jakarta 2011**). Several pedagogical tools are recommended, including: storybooks, cartoons, games and the internet to continue in the application of DRR. In such study AGREE II Instrument was used by 35 experts in the field to measure the content validity, reliability, and applicability of the final guideline format. The Ministry of education provides dedicated educational guideline. In 2006 **MEXT** enacted a basic strategy to promote nationwide commitment to reduce disaster risks. The particular focus on school children started safety act by 1958 and making compulsory at school curricula practice by 2008. Uses AGREE II tool, which revealed that the guideline is relevant, clear, simple, and contain no ambiguity of data. The total score of AGREE II tool was 90.82% which indicate that this guideline contain high quality data (**table VI**). The experts accept that the guideline can be

applied since the result validity of the disaster risk reduction guideline for implementation (overall score from each evaluator was 129 an average content validity index of the 0.921 was obtained) (**table VII**). This index indicated that guideline were relevant and clear. **Adiyoso and Kanegae (2013)** When present guideline that effectively increased students knowledge, risk perception, critical awareness and attitude toward preparedness behavior despite limited different forms of disaster.

Thus, the study findings prove, that a significant improvement in the studied students disable rile related knowledge and practice across the guideline implementation phases (**table V**). The current results go in line with **Abdel Sattar, Zahra, Mohamed (2018)** who found a statistically significant difference between nursing internship student' mean knowledge score and pre post participation in disaster preparedness program.

Disaster nurse must understand the content and location of the disaster plan including the planning and provision of training for nurses, such as disaster drills, cooperate with other agencies in developing plans to decrease the morbidity and mortality rates and to reduce the potential effects of disaster **(Al Thobaity, Plummer, & Williams, 2016)**. Disaster preparedness include development early warning system and evacuation plan to decrease potential loss of life and physical damage; public education and training of designed public and private sector official; training of emergency response personal; collaborative organization agreement and service delivery standard; strengthening local disaster preparedness by supporting community-based activities. Local disaster preparedness includes teaching first aid and cardiopulmonary resuscitation. Education and preparation to minimize risk conducted by mass media, school program and health fairs **(Herlianita 2017)**.

V. Conclusion

The findings of the present study revealed that, the implementation of the disaster risk reduction program sessions leads to effective in safety behavior among students practice pre and post scenario application through observation of the students during evacuation drill, use of fire extinguisher and first aid through simulation in the school environment.

Where, the present study showed that high percentage of the studied students had poor of knowledge in the pre-guideline use about the disasters domains; which include types of disasters, phases of disasters and management of disasters. While, majority the studied students had good knowledge about disaster domain on post1 and post 2 guideline implementation phases. Finally, the application of the disaster risk reduction guideline positively affects the governmental primary schools students' safety behavior.

VI. Recommendations

Based on the findings of the present study, the following recommendations are suggested:

I- <u>Ministerial approach recommendations:</u>

In order to promote cooperation agreements between educational institutions and civil society organizations the following are needed:

1- Tailor school specific preventive strategies to achieve school safety aims and objectives which derived from the comprehensive standardized national disaster prevention strategies.
2- Integrate DRR into curriculum education of the schools based on the predefined risk reduction comprehensive strategies.

3- Revise curricular materials concerning crisis and disasters management to include all recent information on crises and disaster risk reduction in the schools, and methods of dealing with it.

4- Use mass media to provide more information about safety and disaster management in radio, television, social media and in school curriculum

5- Training programs, manual and media should be developed in order to empower students and teachers to provide proper education messages and conduct practical exercises regarding disaster management.

6- Allocation of resources to school committee for the maintenance of emergency instruments as needed for complete safety measures.

II- <u>School based approach recommendations:</u>

1- Encourage student to share in the different committees as crisis and disaster or Red Crescent and allow them to express their suggestions and help them to be positive citizen.
2- Distribute media as videos or computers applications for better clarification on disaster crisis management at school.
3- Motivate teachers to be involved in disaster and crisis management activities and received suitable training about fire management, first aids and mock drill.
4- Constant message must be held weekly regarding disaster management that can reach students through the school mass media broadcast.
5- well-planned drills must be held monthly or at least two times per semester and encourage students to be active participate in disaster and crisis committee activities.
6- Teacher should be speed more time with student weekly to discuss importance of student trainings on evacuation plan and how to deal with any emergency situations this time must be scheduled one time per week.
7- Provide booklet explaining the safety, security & evacuation procedures in effective manner and meet the student's development stage.
8- Activate annual School Safety Day during the second week of October to create space for a wide range of awareness activities and provide reward for the active students participated in disaster committee activities.
9- Provide school approval to do fieldtrip to civil protection, firefighting department and Red Cross/Red Crescent Society.

III- <u>Committee approach recommendations:</u>

1- For effective and efficient disaster and crisis management, each school should improve the role of disaster and crisis committee in planning, organizing, implementation, evaluation and review disaster and crisis management activities with respect to improve the role of each subgroup (rescue, first aid, fire protection …etc.).

2- Committee members should be obtain comprehensive safety training includes rescue and relief, emergency shelter, first medical aid and firefighting management.

3- Schedule a fixed time of meeting must be held to help disaster and crisis committee to discuss the main issues and obstacles facing them with their safety partners as nurses, teachers, maintenance staff fire, emergency medical services, and medical emergency management agencies to discuss safety, security, and planning strategies.

4- Improve role of the school health nurse and disaster and crisis committee in screening and threat assessment procedures to identify physical, biological and chemical threats to student's health within the school environment and meet the needs of individuals at risk.

5- A well designed poster containing announcement regarding emergency plan should be available at school with full description of the role of each member at school in case of disaster and contain a referee when possible.

6- School emergency plans should be reviewed and updated annually by the responsible staff.

7- Create an effective9 system to monitor and record environmental hazards within the school environment, data should be reviewed by the committee to identify patterns and risks for crisis and reported to school authority and school administrator.

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