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# Practices and Level of Awareness on the Basic Safety Precautions on Electrical Fire Prevention among Residence in Bislig City, Philippines

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***Abstract:*** *This study aims to investigate the practices, level of awareness, and behavior on the basic safety precautions on electrical fire prevention among residents in the City of Bislig, Philippines. The study uses descriptive method of research utilizing a researcher-made survey-questionnaire. Microsoft Excel and SPSS version 21 were used to analyze the collected data. The study revealed areas of concern that need immediate interventions. In terms of practices, respondents have low level of practice for annual house wiring inspection, poor habit in securing building permits and clearances; and no structured house routines for electrical fire prevention. Respondents level of awareness showed that they are not highly aware of the correct ampere rating of fuse and circuit breaker, standard size and type of electrical wire intended for lightings, convenience outlets, and extension wires. With regards to their behavior, mosta of them havelow level of behavioral consistency in participating activities involving electrical fire prevention and are not consistent in seeking additional knowledge about fire prevention. Recommendation for collaboration among private and public concerned agencies was identified to strengthen the implementation of information and awareness drive activities that could address the mentioned areas of concern.*

***Background****: Electrical fire is one of the top three causes of residential fire incidents in the Philippines with its primary known reasons due to short circuit and overloading. Bislig Citylocated in the eastern part of Mindanao Island,Philippines, considered electrical fire asthe top cause of fire incidents in residential buildings from 2015-2018. Hence, the situation required investigation with regards residential fire incidents. Moreover, the study also investigated the practices, level of awareness, and behavioralconsistency among residence in the area. This nature of study is done since there is no record being done yet that focused on people's practice, level of awareness and behavior when it comes to electrical fire prevention among households in this City.*

***Materials and Methods****: In this randomized study, validated self-made questionnaire was employed to gather much needed data about respondents' knowledge on the three key factors; practice, awareness and behavior on safety precautions regarding residential electrical fire prevention. Respondents were grouped according to their household construction types, classified as wood household, semi-concrete household and concrete household. Descriptive method was used to quantify respondents' answer in each key factor and all mean results were compared and interpreted accordingly.*

***Results****: The top most common practices that can cause electrical fire among the respondents were unchecked house wiring by a licensed electrician, using substandard wires for lighting connections, using incorrect ampere rating for fuse and circuit breaker, using below standard cable for extension wires and children can reach convenience outlets with no safety cover. Respondents' are moderately aware of the causes of residential electrical fire and safety precautions.The findings show that they do not have a regular schedule or yearly inspection of their house wirings. In terms of respondents' level of behavior, it showed that they only moderately follow the basic and convenient ways of doing safety practices against residential fire.*

***Conclusion:*** *Respondents' level of practice must be improved by actively participating in the conduct of evaluation and assessment activities or programs sponsored by the mentioned local agencies in Bislig City. They must be educated to secure electrical permits whenever they desired for changes, alterations, and extensions of their house wirings. Through regular information drive campaigns, respondents can also give information to establish a more structured house routine on electrical fire prevention which can help them organize, prioritize, and can train children to practice safety precautions. They also need an education that fire extinguisher is crucial and should be encouraged to secure one fire extinguisher.*

***Key Word****: Electrical Fire, Residence, Safety Precautions, Awareness, Practice, Behavior*

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## I. Introduction

The National Electrification Administration (NEA) under the umbrella of the Department of Energy (DoE) has the mandate for rural electrification program in the country. At present, NEA is continually doing its best to serve the remaining 2.7 million households without electricity in the country (Laput, 2019). Clearly, the demand and consumption of electricity in residential buildings is highly increasing as it becomes a basic need of the Filipino people. But with the benefits, convenience and comfort it brings, the dangers and hazards that electricity might cause should not be forgotten. Electrical fire is caused by electrical materials and house wiring systems affected by unexpected faults and errors such as short circuit, overloading, arcing and unplug television or other appliances (Campbell, 2019 & Lee et. al, 2016). It is a Class C type of fire in which types ABC Powder, Water Mist and Clean Agent fire extinguishers are being used to quench this type of flame (Koorsen Fire & Security, 2017). Electrical ignition is gradually becoming a serious issue as it posted a higher percentage of 5,366 electrical-related fires out of 19,292 fire incidents, which is equivalent to 27.81% last 2018 nationwide (Bautista, M.F. N., 2018).

The current data obtained from the Bureau of Fire Protection (BFP)- Caraga Region revealed that in all fire incidents happened from the year 2015 to 2018, electrical-related fire is on top spot with a record of 475 (36.76%) out of 1,292 total fire incidents (Fire Officer I R. P. Perocho, personal communication, July10, 2019). Moreover, the current data obtained from BFP- Bislig City also revealed that for the same period, faultyelectrical wiring is the top cause of residential fire incidents with a record of 11 (44%) out of 25 fire incidents (Fire Officer III R. A. Go, personal communication, November 7, 2019). Meanwhile, in Region VI, it was found out that short circuit is one of the crucial causes of electrical fire incidents in Aklan province, while electrical wires overheating is the cause of fire in the district of Antique. Provinces of Iloilo and Negros Occidental had the highest rate of fire incidents caused by electrical post-fire. It found out that certain appliances like electric fans, ceiling fans, flat irons, water heaters are also the main reason for electrical fire (Occeño, 2016).

The abovementioned data revealed specific reasons of an electrical fire. It pointed out that household electricity consumers lack knowledge about awareness and safety practices on how to prevent a residential electrical fire. In addition, this type of blaze is prevalent and identified to be the number one reason for household fire incidents in the City of Bislig and also in the entire Caraga Region (Agusan del Sur, Agusan del Norte, Dinagat Islands, Surigao del Sur, and Surigao del Norte).

These facts need an immediate attention to know the households' wiring conditions and the level of awareness, practice, and behavior on the necessary safety precautions on residential electrical fire among the people living in the City of Bislig.

It is within this context that the study aims to investigate the practices, level of awareness, and behavior on the basic safety precautions on electrical fire prevention among residents in the City of Bislig, Philippines The resultsleads to advocate and strengthen beneficial programs in helping Bisliganons to prevent and eliminate residential electrical fires to occur in the future, saving their lives and hard-earned properties.

**Purpose of the Study:**

The main objective of this study is to investigate the practices, level of awarenessand behavior on the basic safety precautions on electrical fire prevention among residence in Bislig City. The study also aims to identify the significant relationship among the practices, level of awareness and behavior of the respondents on the basic safety precautions on electrical fire prevention. The significant difference among the concrete, semi-concrete and wood households were also compared to address the areas of concerned with regards the basic safety precautions on residential electrical fire prevention amonghouseholds in the said city.

## II. Material and Methods

This descriptive quantitative research employed a survey-questionnaire among household residence in Bislig City, Philippines in summer 2020. The respondents were composed of 25 wood household residence, 25, semi-concrete household residence and 25 concrete household residence with a total of 75 respondents. The selection of the households was based on the Implementing Rules and Regulations (IRR) of the National Building Code of the Philippines of 2005.

**Research instrument**

The researchers used a self-constructed survey-questionnaire anchored on Republic Act 9514 also known as *Fire Code of the Philippines of 2008*, Philippine Electrical Code (PEC) and vital information from BFP- Bislig City, SURSECO-I and City Engineering Office- Office of Building Official (OBO). The said questionnaire was also validated by focal persons in the said agencies. The instrument iscentered on measuring the practice, level of awareness, and behavior of respondents with respect to basic safety precautions on electrical fire.

**Data Gathering Procedure**

A letter of request was sent to Bislig City Mayor's Office and to the Barangay Captains of five (5) involved barangays (Comawas, Maharlika, Mangagoy, Poblacion and Tabon)for the conduct of this study. There were fifteen (15) household-respondents in every barangay purposely selected to answer the survey-questionnaire. Their answers were validated through on-the-spot ocular inspection of their households' wirings. The gathered data was treated with the appropriate statistical methods. A secondary data was also requested from the Bureau of Fire Protection- Bislig City to triangulate the existing advocacies and programs on electrical fire prevention.This is for the purpose of knowing the existing programs on electrical fire prevention implemented by the private and public concerned agencies. Informal form of interviews from the resource persons of the said agencies was also conducted to gather more relevant information.

**Statistical analysis**

The data was treated appropriately by the following statistical methods:Weighted Mean to identify the level of awareness, practice and behavior of the respondents on significant safety precautions on electrical fire prevention through its grand mean;Pearson's r Correlation to numerically measure the significant relationship among the level of awareness, practice and behavior on electrical fire prevention; and T-test to check significant differences among wood, semi-concrete and concrete households' level of practice and level of awareness vis-à-vis level of behavior on residential electrical fire prevention.

## III. Result

**Table 1.** Respondents' Common Practices that can cause Electrical Fire

| Questions | Answered Yes | Percentage |
|---|---|---|
| 1. Flying connection (neighbor will tap/connect from your own electrical supply). | 2 | 3% |
| 2. Unattended/forgotten charging of laptops, cellphones and the like. | 11 | 15% |
| 3. Make changes, extension and alteration of house wiring without consulting licensed electrician. | 9 | 12% |
| 4. Use of substandard and not recommended extension wire. | 19 | 25% |
| 5. Using plugs that are not rightly fit to the outlets. | 4 | 5% |
| 6. Still using appliances that encountered trouble before without consulting licensed technician. | 0 | 0% |
| 7. Unattended/forgotten utilization of appliances such as electric heaters. | 2 | 3% |
| 8. Using incorrect ampere rating of fuses and circuit breakers in house wirings. | 25 | 33% |
| 9. Overloading by plugging in multiple appliances that is beyond the capacity of wire. | 2 | 3% |
| 10. Unchecked house wiring by licensed electrician. | 40 | 53% |
| 11. Still using old electrical materials such as switches and outlets even they encountered trouble before. | 2 | 3% |
| 12. Still using old electrical materials such as wires even they encountered trouble before. | 0 | 0% |
| 13. Unreported case of electrical trouble in your house to the licensed electrician. | 10 | 13% |
| 14. Replacing burned fuses without consulting licensed electrician. | 13 | 17% |
| 15. Children can reach uncovered electrical outlets. | 29 | 39% |
| 16. Not reading and following manuals' safety precautions in using home appliances and gadgets. | 19 | 25% |
| 17. Did not unplug appliances even after use. | 3 | 4% |
| 18. Using substandard wires for the Lightings. | 30 | 40% |
| 19. Using substandard wires for the convenience outlets. | 12 | 16% |
| 20. Convenience outlets, lightings and its wires are exposed to heat and rain conditions. | 7 | 9% |

Table 1 provides the details on respondents' plebeian household practices that cause fire. Unchecked house wirings by licensed electricians (53%) top the list in which the majority of the respondents do not have a regular routine for their house wirings' inspection and maintenance. Other risky practices include the use of substandard wires for lightings (40%), 39%on how children can freely and conveniently reachoutlets with no covers and to the use ofincorrect ampere ratings of fuses and circuit breakers (33%). The inaccurate high ampere ratings of fuse and circuit breakers can cause an electrical fire because it won't open or disconnect the line instantly if there are overloads, short circuits or ground faults in the house wirings.Another risk among the respondents is not reading safety manuals (25%). Changing or altering house wirings without consulting licensed electricians can become an immediate cause of electrical fires because of a lack of expertise and

technical knowledge. Another hazardous practice also is using unfit convenience outlets and plug (5%), which is dangerous as it can cause a spark.Unplugged appliances, even when not in use (4%) is also a risk factor to watch out that can cause a source of an electrical fire. Two respondents practiced flying connections (illegal tapping)(3%). This dangerous execution can cause overloading and might burn the wires used into it, which will result in electrical fires among the involved houses.

**Table 2**. On-the-Spot Ocular Inspection Results

| Questions | Present | Percentage |
|---|---|---|
| 1. Unprotected/exposed wirings outside the house. | 8 | 11% |
| 2. Unprotected/exposed wirings inside the house | 21 | 28% |
| 3. Using substandard wires for lighting outlets | 37 | 49% |
| 4. Using substandard wires for Convenience outlets | 14 | 19% |
| 5. Using substandard wires for extension wires | 22 | 29% |
| 6. Using substandard wires for ACUs | 0 | 0% |
| 7. Old electrical materials (15 years above) | 43 | 57% |
| 8. Old electrical wires (15 years above) | 41 | 55% |
| 9. Using substandard circuit breaker rating | 4 | 5% |
| 10. Using substandard fuse rating | 22 | 29% |
| 11. Inside lightings are exposed to rain/direct sunlight/moist condition | 0 | 0% |
| 12. Inside outlets are exposed to rain/direct sunlight/moist condition | 0 | 0% |
| 13. Outside lightings are exposed to rain/direct sunlight/moist condition | 2 | 3% |
| 14. Outside outlets are exposed to rain/direct sunlight/moist condition | 1 | 1% |

Table 2 presents the results of on-the-spot ocular inspection done by the researcher with the following findings:Old electrical materials older than 15 years and above got the top spot (57%) followed by old electrical wirings (55%) that are still used by the respondents. The said electrical materials include switches, convenience outlets, lamp holders, and the like.Another result to consider is the use of substandard wires in lighting outlets (49%); use of substandard extension wires (29%), and wrong fuse rating (29%). A visual inspection was done to check if there were any lights, convenience outlets, switches and wires that are exposed to direct heat and rain.It was found out that exposed wirings (11%), exposed lightings (3%) and exposed convenience outlets (1%) were present. It was also observed that old kilowatt-hour meters used by the respondents need replacement while service drop electrical wires exposed barely to rain and direct heat of the sun, can cause the splices to produce a spark in any moment because of the deterioration of wires and insulator.

*Respondents level of knowledge on the basic safety precautions on residential electrical fire in terms of Practice, Awareness andBehavior.*

**Table 3** Respondents' Level of Practice

| Questions | Weighted Mean | Qualitative Description |
|---|---|---|
| 1. Licensed electrician check the condition of our house wiring and electrical materials on regular basis. If practiced, Check the frequency:<br>a.( ) once a year b.( ) twice a year<br>c.( ) thrice a year d. ( ) others, specify | 2.20 | Lowly Practiced |
| 2. Avoid octopus connection by not plugging into one extension wire multiple connections and loads. | 3.15 | Moderately Practiced |
| 3.Avoid overloading by not using appliances and other loads beyond the limit of wire ampacity and capacity | 3.47 | Highly Practiced |
| 4.Avoid short circuit by visual inspection for open connections and not properly connected wires that may contact with each other and consult licensed electrician if there's any. | 3.04 | Moderately Practiced |
| 5.Follow and maintain the correct fuse/circuit breaker ampere ratings and sizes of wire. | 2.81 | Moderately Practiced |
| 6.Consult licensed electrician to do additional connections, alteration and extension of our house wiring. | 3.68 | Highly Practiced |
| 7.Read and follow manual's safety precautions on appliances and gadgets. | 2.75 | Moderately Practiced |
| 8.House wiring is properly protected against moisture, getting wet and rat bites. | 3.56 | Highly Practiced |
| 9.Complied all the necessary electrical permits for our house wiring. | 2.08 | Lowly Practiced |
| 10.Educate my children/siblings about proper appliance plugging and light | 3.29 | Highly Practiced |

| | | |
|---|---|---|
| switching. Not to play with outlets and switches. | | |
| 11.Take extra careful and attention in charging cellular phones, laptops and the like by not leaving nor forgetting. | 3.40 | Highly Practiced |
| 12.Turn off safety switch/ panel board if no one is left at home. | 3.71 | Highly Practiced |
| 13.Use electrical fire warning devices such as fire alarm system in my house. | 1.12 | Not Practiced |
| 14.Has fire extinguisher intended for electrical fire. | 1.13 | Not Practiced |
| 15.Exterior convenience outlets and lightings installed outside the house are properly protected against weather conditions. | 3.71 | Highly Practiced |
| 16.Consult licensed electrician to replace defective switches, outlets, fuses and circuit breakers caused by unexpected incidents/ troubles. | 3.64 | Highly Practiced |
| 17.Extension wires are free from obstruction and do not run under carpets or any cloth materials. Used correct wire size. | 2.95 | Moderately Practiced |
| 18.Consult licensed technician to check the condition of home appliances once trouble occurs. | 3.37 | Highly Practiced |
| 19.Established own practices and routines on electrical fire prevention. | 2.32 | Lowly Practiced |
| 20.Avoid flying connection by not letting others tap/connect from my own electrical supply. | 3.83 | Highly Practiced |
| **Grand Mean** | **2.96** | **Moderately Practiced** |

**Legend:** 1.0 - 1.75 = Not Practiced; 1.76 - 2.50 = Lowly Practiced;
2.51 - 3.25 = Moderately Practiced 3.26 - 4.0 = Highly Practiced

Table 3 deals with the respondents' level of exercise practice on electrical fire prevention. It shows the congruence of their level of awareness, habitual exercises, and the on-the-spot ocular inspection results concerning their level of executions. It explains the consonance of respondents' answers, whether they practiced what they know or not regarding electrical fire prevention. The grand mean of 2.96 indicates that they "Moderately Practiced" safety precautions. Though this signifies good impression, the researcher believes that that are still room for improvement and there is a need to raise their level of practice into the highest level as possible for all of them to highly practice the primary safety precautions on electrical fire prevention.

**Table 4.** Respondents' Level of Awareness

| Questions | Weighted mean | Qualitative Description |
|---|---|---|
| 1. Is aware about residential electrical fire incidents and the danger and hazards it might bring to your family. | 2.63 | Moderately Aware |
| 2. Is aware of the possible reasons why electrical fire happens. 2.1. If aware, write the possible reasons:1_____ 2_____ 3 _____ 4 _____ | 2.59 | Moderately Aware |
| 3. Is aware that house wiring must be checked and tested on regular basis. If aware, Check the frequency: 1. ( )once a year 2.( )twice a year 3.( )thrice a year 4.( )others, specify | 2.53 | Moderately Aware |
| 4. Is aware that overloading is using multiple appliances and consuming electricity beyond the limit of wire ampacity. | 3.27 | Highly Aware |
| 5. Is aware that short circuit means not properly connected and protected wires that may contact to other wires/connections. | 2.40 | Moderately Aware |
| 6. Is aware that octopus connection has many appliances and gadgets plugged in single extension wire resulting to multiple wires entangled with one another. | 2.51 | Moderately Aware |
| 7. Is aware that extension wires must be free from any obstruction and not run under carpet and any cloth material using standard wire sizes. | 2.79 | Moderately Aware |
| 8. Is aware of the standard circuit breaker/fuse ampere ratings and wire sizes in house wiring. | 1.73 | Not Aware |
| 9. Is aware that it is necessary to a consult licensed electrician whenever additional, alteration and changes of house wiring is desired. | 3.68 | Highly Aware |
| 10. Is aware that electrical wire and convenience outlet should be properly protected against moisture, rain and extreme weather condition. | 3.77 | Highly Aware |
| 11. Is aware that electrical permits and approval from authorized offices on house wiring should be accomplished. | 3.57 | Highly Aware |
| 12. Is aware that children should be taught and guided properly about appliance plugging and light switching. Not to play with outlets and switches. | 3.44 | Highly Aware |
| 13. Is aware that charging of cellular phones, laptops and the like can be a cause of electrical fire once left unattended. | 3.72 | Highly Aware |
| 14. Is aware that old electrical materials such as wires, switches and convenience outlets should be check and replace if needed. | 3.28 | Highly Aware |
| 15. Is aware that safety switch/ panel board should be turn off if no one is left at home. | 3.77 | Highly Aware |
| 16. Is aware that electrical fire warning devices such as fire alarm system is very important to be used in your house. Do you have fire alarm system? ( ) Yes ( ) No | 2.36 | Lowly Aware |

| | | |
|---|---|---|
| 17. Is aware that fire extinguisher should be present intended to fight electrical fire. Do you have electrical fire extinguisher? ( ) Yes ( ) No | 3.05 | Moderately Aware |
| 18. Is aware that convenience outlets and lightings should not be installed in places that might exposed them to rain and wet conditions. | 3.73 | Highly Aware |
| 19. Is aware that by not reading and following manuals' safety precautions of home appliances and gadgets can cause electrical fire. | 3.19 | Moderately Aware |
| 20. Is aware that flying connection can cause overloading and electrical fire. | 3.76 | Highly Aware |
| **Grand Mean** | **3.09** | **Moderately Aware** |

**Legend:** 1.0 - 1.75 = Not Aware; 1.76 - 2.50 = Lowly Aware;
2.51 - 3.25 = Moderately Aware 3.26 - 4.0 = Highly Aware

Table 4reveals the weighted mean and grand mean results of respondents' level of awareness regarding electrical fire prevention. Though this signifies good impression, the researcher believes that that are still room for improvement and there is a need to raise their level of awareness into the highest level as possiblefor all of them to be more aware of the primary safety precautions on electrical fire prevention.

**Table 5.**Respondents' Level of Behavior

| Questions | Weighted Mean | Qualitative Description |
|---|---|---|
| 1.Actively participate in any activities regarding electrical fire prevention. | 1.80 | Lowly Consistent |
| 2.Seriously follow advices and comments from a licensed electrician in keeping our house wiring safe. | 3.27 | Highly Consistent |
| 3.Seriously follow advices and comments from licensed technician on proper appliance use. | 3.27 | Highly Consistent |
| 4.All family members follow manuals' safety precautions on appliances and gadgets use. | 3.17 | Moderately Consistent |
| 5.Share my learnings about electrical fire to other people. If observed, specify to whom: ( ) neighbors ( ) friends ( ) family ( ) relatives ( ) others Specify _____ | 2.25 | Lowly Consistent |
| 6.Follow own family's established practices and routines on electrical fire prevention. | 2.31 | Lowly Consistent |
| 7.Positively perform electrical fire precautions as part of family's daily routines. | 3.23 | Moderately Consistent |
| 8.Regard electrical fire prevention as family's main concern and responsibility. | 3.73 | Highly Consistent |
| 9.Seriously follow government agencies' advocacies and programs on fire prevention. | 2.99 | Moderately Consistent |
| 10.Seek additional knowledge on electrical fire prevention through the research and readings. | 2.01 | Lowly Consistent |
| **Grand Mean** | **2.80** | **Moderately Consistent** |

**Legend:** 1.0 - 1.75 = Not Consistent; 1.76 - 2.50 = Lowly Consistent;
2.51 - 3.25 = Moderately Consistent 3.26 - 4.0 = Highly Practiced

Table 5 shows the findings and results of respondents' level of consistency in doing safety precautions in preventing residential electrical fire and its congruence on their level of practice and customary practice results. Respondents scored a grand mean of 2.80, which indicates that they are "Moderately Consistent" in doing safety practices. Though this signifies good impression, the researchers believe that that are still room for improvement and there is a need to raise their level of behavioral consistencyin practicing the primary safety precautions on electrical fire prevention into highest level as possible.

*The significant differences between respondents' practices, level of awareness and behavior is presented in Table 6*

**Table 6.**Practices vs Level of Awareness vs Behavior Correlation

| Variables | t | Level of Significance | Interpretation | Decision |
|---|---|---|---|---|
| Level of Awareness vs Level of Practice | 3.37 | .001 | Significant | Not Accept Null Hypothesis |
| Level of Awareness vs Level of Behavior | 7.33 | .000002 | Significant | Not Accept Null Hypothesis |

*N=**75.** p < **.05;***

Table 6 shows the significant difference between respondents' level of awareness and level of practice, also with their level of awareness and level of behavior. The results show that their level of awareness and level of practice has significant difference with each other (p-value= .001). The level of practice and level of behavior also has a significant difference (p-value= .000002).

*Significant differences among the respondents residing in Concrete, Semi-Concrete and Wood Households*

**Table 7.** Wood Households vs Semi-concrete Households Correlation

| Variable | Wood vs Semi-concrete | | | |
|---|---|---|---|---|
| | t | Level of Significance | Interpretation | Decision |
| Level of Awareness | 0.23 | 0.82 | Not Significant | Accept Null Hypothesis |
| Level of Practice | -1.47 | 0.15 | Not Significant | Accept Null Hypothesis |
| Level of Behavior | 0.25 | 0.80 | Not Significant | Accept Null Hypothesis |

*N=5**0** (25 wood, 25 semi-concrete).p < **.05;***

Table 7reveals that there are no significant differences between wood and semi-concrete households in terms of level of awareness (p-value= .82), level of practice (p-value= .15), and level of behavior (p-value= .80). Therefore, the null hypothesis there is no significant difference between wood and semi-concrete households in terms of level of awareness, level of practice and level of behavior on the basic safety precautions on electrical fire prevention among residence in Bislig City is accepted.

**Table 8.** Semi-concrete Households vs Concrete Households Correlation

| Variable | Semi-concrete vs Concrete | | | |
|---|---|---|---|---|
| | t | Level of Significance | Interpretation | Decision |
| Level of Awareness | -2.82 | 0.01 | Significant | Not Accept Null Hypothesis |
| Level of Practice | -4.8 | .00002 | Significant | Not Accept Null Hypothesis |
| Level of Behavior | -4.15 | .00014 | Significant | Not Accept Null Hypothesis |

*N=5**0** (25 wood, 25 semi-concrete).p < **.05;***

Table 8 reveals that there are significant differences between semi-concrete and concrete households in terms of level of awareness (p-value= 01), level of practice (p-value= .00002) and level of behavior (.00014). This means that there is a reliable difference between their survey-questions items' means and its grand means in their level of awareness, practice and behavior at some degree.Therefore, the null hypothesis there is no significant difference between semi-concrete and concrete households in terms of level of awareness, level of practice and level of behavior on the basic safety precautions on electrical fire prevention among residence in Bislig City is not accepted.

**Table 9.** Concrete Households vs Wood Households Correlation

| Variable | Concrete vs Wood | | | |
|---|---|---|---|---|
| | t | Level of Significance | Interpretation | Decision |
| Level of Awareness | 2.52 | 0.02 | Significant | Not Accept Null Hypothesis |
| Level of Practice | 6.23 | .000002 | Significant | Not Accept Null Hypothesis |
| Level of Behavior | 3.67 | .001 | Significant | Not Accept Null Hypothesis |

*N=5**0** (25 wood, 25 semi-concrete).p < **.05;***

Table 9 shows the significant difference between concrete and wood households in terms of level of awareness (p-value= .02), level of practice (p-value= .000002) and level of behavior (p-value= 001). This also means that there is a reliable difference between their survey-questions items' means and its grand means, and that their level of awareness, practice and behavior are significantly different with each other at some degree. Therefore, the null hypothesis there is no significant difference between concrete and wood households in terms of level of awareness, level of practice and level of behavior on the basic safety precautions on electrical fire prevention among residence in Bislig City is not accepted.

## IV. Discussion

*Respondents' common practices that can cause a residential electrical fire*

Based on the actual scenario observed, most of the household only consult and call an electrician when electrical troubles arise. Other risky practices include the use of substandard wires for lightings (40%), where the respondents only prefer to use smaller sizes and wrong types of wire for lighting connections. The respondents perceived that they have the right alternatives as efficient and cost-effective practices. Moreover, 39% of an alarming households' concern surveyed on how children can freely and conveniently reach and touch outlets with no covers. The situation is disturbing to consider because of the high risked threats among household members. Children have no idea what are the risks and dangers of fire, so parents need to take precautionary measures to keep everyone safe (Starr, 2020). In terms of usage, the respondents do not have convenience outlets in their houses that have safety plate covers. This fact can attribute to the no cover convenience outlet, which is the only most common type and readily available among electrical stores in Bislig City.

One of the risky practices to note is incorrect ampere ratings of fuses and circuit breakers (33%). By definition, fuses and circuit breakers categorized as overcurrent protective devices which open the circuit or disconnect the line when the current rating capacity of the equipment protected and exceeded (Fajardo Jr. and Fajardo, 2000). The exceeded current may result in overcurrent, which is caused by overload, short circuit, or ground fault (IIEE, 2016). Circuit breakers and fuses should match the ampere capacity of the wires it is protecting and is designed to trip or blow before the circuit wires can heat to a dangerous level if there are electrical faults (Formisano, 2020). The usual incorrect ratings among the respondents, as discovered by the researcher, were 30/30 ratings and 20/30 ratings even though they are using a minimal number of lights and appliances. The inaccurate high ampere ratings of fuse and circuit breakers can cause an electrical fire because it won't open or disconnect the line instantly if there are overloads, short circuits or ground faults in the house wirings. Based on Philippine Electrical Code recommendations, (a) *A 15 or 20 amperes branch circuit shall be permitted to supply lighting units or other utilization equipment, or a combination of both, and shall comply with 2.10.2.5(a)(1) and (a)(2).*, *(b) A 30-ampere branch circuit shall be permitted to supply fixed lighting units with heavy-duty lamp holders in other than a dwelling unit(s) or utilization equipment in any occupancy*. A rating of anyone cord-and-plug-connected utilization equipment shall not exceed 80 percent of the branch-circuit ampere rating (IIEE, 2016). The ideal to use is the 15/20 ampere ratings, in which the 15 amperes protect the lighting outlets, 20 amperes protects the convenience outlets, and 30 amperes for the major protection of those who used circuit breakers. Additional loads should compute using Ohm's Law, and the majority of the respondents do not have any knowledge of this.

Given this fact, aside from electricians, house owners should have precise apprehension on this matter for them to follow the standard ampere ratings of the said devices. It was discovered that there were three respondents still used No. 12 AWG solid wire, cigarette foil, and scotch tape as a replacement for the burnt fuses, and the critical part was that the house owners were the one who did replace the burnt fuses without consulting a licensed electrician. This practice is dangerous and can cause electrical fires, as mentioned earlier by not conforming to the standards of Philippine Electrical Code.

Another hazardous practice also is using unfit convenience outlets and plug (5%), which is dangerous as it can cause a spark. Spark is blue colored, a natural appearance as the electrons begin to flow into the appliance's power cord (Pollick, 2020). Though it seems typical at first, frequent spark might be a sign of deeper problems such as; short circuit, water (moist), old age of materials, and lousy repair jobs ("Outlet Sparks: How Dangerous Are They?", 2014). Spark can also cause the fire to ignite around, given with highly flammable materials within its surroundings.

Unplugged appliances, even when not in use (4%) is also a risk factor to watch out that can cause a source of an electrical fire. This study emphasized by Lee et al. (2016) stated that television, when not it used, must plug out, for it can be a source of the fire. Another is the unattended/forgotten appliances such as heaters while in use (3%). On the contrary, based on the survey results the disregarded devices were not heaters but electric fans. Multiple plugging in of different appliances that may result in overloading scored low (3%), but it is still an area of concern for it can potentially cause a fire to ignite. On the use of electrical materials that encountered electrical troubles before, two respondents (3%) admitted that they used switches and convenience outlets came across electrical burden before because the said materials just produced sparks and not so intently damaged, but this practice is precarious. It is good to note that no respondents used electrical wires that encountered troubles before.

It was noted that there were two respondents who practiced flying connections (illegal tapping) (3%) based on the ocular survey conducted.This dangerous execution can cause overloading and might burn the wires used into it, which will result in electrical fires among the involved houses

**On-the-spot Ocular Inspection**

To validate respondents' answers to some of the most critical issues on usual practices survey, the on-the-spot ocular inspection performed by the researcher. This inspection obtained to check respondents' house wiring conditions and gave advice on electrical safety to those who need it. Based on the survey conducted, it found out that some respondents were not aware that they were already doing risky practices. When investigated, most of the respondents naively denied about the situation. Respondents claimed to have no responsibility at all in terms of performing wire tasks; instead, it is the electrician's responsibility to execute the checking and wiring as they believed to be experts in the situation. From the survey, the remaining indicators reflected on respondents' poor knowledge about electrical wiring and installation. Proper education regarding this matter should be delivered to the concerned respondents to educate them especially on the standard ampere rating fuses. Old electrical materials older than 15 years and above got the top spot (57%) followed by old electrical wirings (55%) that are still used by among the respondents. The said electrical materials include switches, convenience outlets, lamp holders, and the like. The identification of house wirings and electrical materials that in use 15 years and above is very significant for it has a higher probability of causing a fire. The older the wire, the greater the incidence rate of fire, conductors used for a long time would possibly allow fewer electrons to pass through decreasing the current carrying capacity of the wire year by year, resulting in a similar cases of improper cable sizing or overheating. Wire insulation also has aging problems such as lowered melting points or even easy to be broken (Lee et al., 2016). Attention on this matter from the BFP, SURSECO-I, and even CEO-OBO to check and evaluate the 25 (33%) houses with house wirings above 15 years electrical materials are needed.

*Respondents level of knowledge on the basic safety precautions on residential electrical fire in terms of Practice, Awareness and Behavior*

*Level of Practice*

Data showed the congruence of their level of awareness, habitual exercises, and the on-the-spot ocular inspection results concerning their level of executions. It explains the consonance of respondents' answers, whether they practiced what they know or not regarding electrical fire prevention. The grand mean of 2.96 indicates that they "Moderately Practiced" safety precautions. Consulting licensed electricians to do change, alterations, and extensions of their house wirings was highly practiced. This consonance aligns with their level of awareness results but will only consult a licensed electrician when electrical troubles arise. In their home appliances, hiring a licensed technician to check appliances conditions that encountered troubles was again highly practiced. But when asked whether they have regular house wiring inspection in a given year, the response is low exercised. This outcome could view in ways the respondents only consult a licensed electrician if they desired any changes or alterations as they believed that critical things happen only when electrical troubles occur.

Furthermore, in protecting electrical materials against the environment, respondents highly practiced in protecting lightings and convenience outlets installed outside their house and protecting house wirings against moisture, rain, and rat bites. This end implies that respondents are aware that exposure of electrical wire to

moisture and rain can create sparks and can ignite materials around; later can lead to electrical fire probably from small sparks it produces fire, although it seems harmless, can provoke a gigantic blaze in no time (Ed M, 2019). Most importantly, respondents highly practiced to avoid flying connections (illegal tapping). They do not allow others to illegally tap or connect from their electrical supply. This result matched their level of awareness wherein they highly aware that flying connections can cause an electrical fire. But in Table 13, two respondents practiced flying connection (3%). This execution is very dangerous as it can cause overloading and might burn the wires used into it, which will result in electrical fires among the involved houses.

It can glean that respondents also have a moderate level of awareness about what an octopus connection is. This effect shows that their understanding and practices about octopus connections are compatible and still need to improve. Second, the respondents are moderately aware of what a short circuit is; this is again in consonance with their level of practice result because they moderately practiced in avoiding multiple connections of electrical loads (appliances) in extension wire causing multiple wires to be entangled resulting to octopus connection. Respondents also moderately practiced visual inspection in their house wirings for open connections and not fittingly connected wires. The respondents got a score of reasonably practiced in using extension wires with correct the size, type, and should free from any obstruction, and this matched their fairly aware score on the use of extension wire.

*Level of Awareness*

This study reveals the weighted mean and grand mean results of respondents' level of awareness regarding electrical fire prevention. Respondents are highly aware that it is necessary to consult a licensed electrician if changes or alterations are desired in their house wirings as much as to check electrical materials (switches, convenience outlets, wires) and to have a replacement if needed. They are highly aware of overloading, extremely aware that convenience outlets should be appropriately protected against rain and extreme weather conditions and should not be installed in wet and exposed to rain places, the same with the lightings. It can be recalled that based on the profile of the respondents, the majority of them have cellular phones (95%), and it is good to note that they are also highly aware that mobile phones, laptops, and the like can cause electrical fire once left unattended. To train and guide children on appliance plugging, light switching, and not to play with it also scored a high level of awareness. In terms of wiring connections, respondents are also highly aware that flying connection (illegal tapping) can cause overloading and electrical fire, electrical permits should accomplish by house owners and to switch off safety switches and panel boards when no one left at home. In a general sense, respondents' level of awareness regarding electrical fire got a Moderately Aware (3.09) rating. Though this signifies a good impression, yet the researcher still believes that there is still room for improvement for them to score higher and be more aware of the primary safety precautions on electrical fire prevention.

*Level of Behavior*

Respondents are highly consistent with regards to electrical fire prevention as their families' core concern and responsibility. Respondents are highly constant in following advices and comments from a licensed electrician in keeping their house wirings safe.

On appliance usage, they also scored highly consistent in following advice and comments from the licensed technicians to proper usage. When it comes on how respondents perceive electrical fire prevention, they were somewhat consistent in performing safety precautions as part of families' priorities. They were also moderately consistent to seriously follow the government's programs and advocacies on fire prevention.

To sum it up, respondents are moderately aware of electrical fire and its causes. In the same manner, they moderately practiced safety precautions in their houses to combat this type of disaster. In terms of their behavior, they also moderately consistent in doing safety measures regarding electrical fire prevention. A good impression as it seems, but the researcher believes that there is room for improvements for the respondents to score higher and, in turn, will reduce the number of residential electrical fires to occur in the future.

*Significant differences between respondents' practice, level of awareness and level of behavior*

Results show that there are significant differences between respondents' level of awareness and level of practice, also between level of awareness and level of behavior. The results show that their level of awareness and level of practice has significant difference with each other (p-value= .001). It can be viewed that a reliable difference exists between the two factors in terms of residential electrical fire prevention. The results affirm the results reflected on tables 3 and 4 in terms of the validity and consistency of respondents' responses in which they have high level of awareness yet not high level of practice on the basic safety precautions. The level of awareness and level of behavior also has a significant difference (p-value= .000002). This also shows that there is again a reliable difference between the mean of these two factors based on Table 4and 5 in which respondents scored not high level of consistency in practicing the basic safety precautions on residential electrical fire

prevention which is in consonance to their level of behavior. The results also imply an undeniable showcase of how respondents being a native of the place show their negative Filipino traits. The respondents have cultivated negative traits towards the issues on dealing with electrical fires. It is obviously presented from the previous tables that respondents are aware, and have practiced and applied the safety precautionary measures on dealing with electrical fire issues yet not in high level. Their actions speak on how they make crucial decision since most of the respondents stayed passive and dismissive of the issue. They are aware but clearly take the opposite actions leaving everything to fate without considering the impact of their decisions. This action supports the "Bahalana" negative mentality of common Filipinos.

*Significant differences among the respondents residing in Concrete, Semi-Concrete and Wood Households*

*Wood Households vs Semi-Concrete Households*

This reveals that there are no significant differences between wood and semi households in terms of level of awareness (p-value= .82), level of practice (p-value= .15), and level of behavior (p-value= .80). This shows that there are no reliable differences between the level of awareness, level of practice and level of behavior between these two household types and survey-questions items' means and its grand means are in the same level not too far from each other in terms of significance. Which in turn clarify that respondents residing in wood and semi-concrete households share the same level of awareness, practice and behavior on the basic safety precautions against electrical fire prevention.Therefore, the null hypothesis there is no significant difference between wood and semi-concrete households in terms of level of awareness, level of practice and level of behavior on the basic safety precautions on electrical fire prevention among residence in Bislig City is accepted.

*Semi-Concrete Households vsConcrete Households*

This reveals that there are significant differences between semi-concrete and concrete households in terms of level of awareness (p-value= 01), level of practice (p-value= .00002) and level of behavior (.00014). This means that there is a reliable difference between their survey-questions items' means and its grand means in their level of awareness, practice and behavior at some degree. This signifies that these two households' means and grand means in three factors do have significant difference with each other. Which in turn clarify that respondents residing in semi-concrete and concrete households do not share the same level of awareness, practice and behavior on the basic safety precautions against electrical fire prevention. This implies that concrete households do have a higher means of awareness, practice and behavior at some degree. This is quite evident as majority of them have undergone and acquired duly approved building permits and fire clearances. Some of the concrete households also have fire extinguishers and practice safety precautions of higher degree as compared to semi-concrete households based on the results of on-the-spot ocular inspection and common practices that can cause electrical fire assessment. Therefore, the null hypothesis there is no significant difference between semi-concrete and concrete households in terms of level of awareness, level of practice and level of behavior on the basic safety precautions on electrical fire prevention among residence in Bislig City is not accepted.

*Concrete Households vs Wood Households*

This shows the significant difference between concrete and wood households in terms of level of awareness (p-value= .02), level of practice (p-value= .000002) and level of behavior (p-value= 001). This also means that there is a reliable difference between their survey-questions items' means and its grand means, and that their level of awareness, practice and behavior are significantly different with each other at some degree. Which in turn clarify that respondents residing in concrete and wood households do not share the same level of awareness, practice and behavior on the basic safety precautions against electrical fire prevention at some degree. The same reasons of differences as mentioned between semi-concrete and concrete are also the differences between wood and concrete households. Therefore, the null hypothesis there is no significant difference between concrete and wood households in terms of level of awareness, level of practice and level of behavior on the basic safety precautions on electrical fire prevention among residence in Bislig City is not accepted.

## V. Conclusion

Respondents' level of practice needs to be improved by actively participating in the conduct of evaluation and assessment activities or programs sponsored by the mentioned local agencies in Bislig City. The respondents must also observe annual house wiring inspection by licensed electrician especially to those houses built three years or more or have house wiring 15 years and above in use. They must be educated to secure electrical permits whenever they desired for changes, alterations, and extensions of their house wirings. Through regular information drive campaigns, respondents can also give information to establish a more structured house

routine on electrical fire prevention which can help them organize, prioritize, and can train children to practice safety precautions. They also need an education that fire extinguisher is crucial and should be encouraged to secure one fire extinguisher.

Respondents' low level of consistency in doing safety precautions can also be improved by exposing them to strengthened information drive campaigns and proper education. They must indulge to seminars and training regularly so that their low level of consistency of participation will improve and for them to gain more knowledge about safety precautions that they can share with their family members and to others. Their low level of consistency in seeking additional information regarding electrical fire prevention also needs to improve as this will educate them to establish a more structured family routine on electrical fire prevention safeguarding their home and family.

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