



**UPPER EXTREMITY PAIN PREVALENCE IN DEAF  
INDIVIDUALS CAUSED BY SUSCEPTIBLE OVERUSE WITHIN A  
CERTAIN SIGN-LANGUAGE INSTITUTION IN LABANGON,  
CEBU CITY**

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**Abstract:** The study of the research was on the basis of the need to identify a correlation of susceptible cases of overuse strain in deaf individuals for potential leads of future research in addressing the healthcare needs in sign language institutions. This study aimed to identify upper extremity pain prevalence in deaf individuals caused by susceptible overuse strain. The research framework was constructed in a two-phase self-analysis; the first-phase, entailing the respondents' current level of pain by means of the NRS & IPT pain scales, and the second-phase; entailing the respondents' weekly past

account of functional limitations extrapolated from the SMFA and DASH questionnaires under a Mixed Quantitative Survey/Interview methodology. The area chosen for the research was in Labangon, Cebu City, within a particular sign-language institution. The respondents of the research were strictly deaf individuals enrolled in the particular sign-language institution. The findings of the research indicated that there was an 85% prevalence of susceptible DASH score indicating the prevalence of susceptible overuse syndrome, with an 82% comprehension rate among respondents to the examination. There is an indication of a call-to-action to fine-tune current assessment tools to adequately be utilized by deaf groups in need of care, and an overall need to expand provider skills based on the findings.

Keywords: Deaf, Deafness, Overuse Syndrome, Pain, Person with Disability, DASH, NRS, IPT, Philippine Deaf Community

### *Introduction and Rationale*



The deaf community presents a challenge to healthcare workers due to the many barriers which nullify standard assessment procedures that are normally administered to the general populace. The barriers range from cultural discrepancies in interpretations of sign language types to environments that deaf individuals live in. This is why there is a need to better enhance an understanding of building communicative principles between the healthcare provider and the patient. (Cockcroft, 2018; Fischer, 2018; Hommes et al., 2018; Naseribooriabadi et al., 2017; *(No Title)*, n.d.; *Philippines Deaf Sign-Language Association.*, n.d.)

Pain in general is defined as physical suffering or discomfort one feels either due to illness or injury. The way the general population acknowledges pain is interpreted and expressed differently than that of those within the deaf community. There are subjective limitations due to the

difference of understanding that hampers the expedient care which a deaf individual may need. The idea of levels of pain is generally a challenge for deaf individuals to understand, and this is why generally accepted assessment tools need to be refined to optimize care to persons with disabilities, PWDs, who are deaf. (Almomani et al., 2019; DOH, n.d.; Marella et al., 2016; *National Institutes of Health Warren Grant Magnuson Clinical Center.*, n.d.; Racquel & Corpuz, 2013)

There are also barriers impacting sign-language teachers that prevent them from teaching deaf individuals, one being the presence of repetitive strain due to the constant need to interpret and facilitate on behalf of their deaf students. This stifles teacher attendance and slows the progress of deaf individuals from learning proficiently. (Chairperson et al., n.d.; Lamba & Upadhyay, 2017; Maric et al., 2019; Mori et al., 2009; Northwestern Medicine, n.d.; *Overuse Injuries*, n.d.; *The DASH Outcome Measure*, n.d.; Qin et al., 2008; Tunde Ajidahun et al., 2016; Wyan et al., 2018)

Although there is past research on Overuse syndrome in correlation to deaf interpreters, there is only very little in terms of the application to the deaf individuals themselves. This presents an obvious gap of information that has not documented the deaf as potential patients of overuse syndrome. In so doing, there is a need to identify patterned possibilities or trends that the deaf also may be endangered to developing overuse syndrome themselves. (Cassandra Chiu, 2017; Department of Labor and Employment, 2018; EDUARDO R. ERMITA & GLORIA MACAPAGAL-ARROYO, 2005; Garcia, 2014; Gaverza, 2014)

The information is necessary for providing potential future epidemiological significance that physical therapists could draw their interventions. It also allows practitioner-patient

communication to develop more readily, which over time could give optimal healthcare to those that are deaf. Within the Philippines, there is a huge need to better incorporate deaf individuals with standardized questionnaires and scales in order to see what works easiest for them. (De et al., 2016; Fellingner et al., 2010; Kaye AD & Shah RV, 2014; Ohlenforst et al., 2017; Palese et al., 2011)

The impact that repetitive strain could have on deaf individuals could lower their quality of life, because of the pain that comes from communicating efficiently. The limit of communication could then develop into a barrier between the practitioner and patient even more, and symptoms could exacerbate. This is precisely why it is imperative to collect and develop a better understanding and communication with the deaf population in order to have a cost-effective and expedient form of healthcare. (Administrator et al., n.d.; Donner et al., 2016; Holman et al., 2019; Punch, 2016; Smith et al., 2000)

Although the information extrapolated within the research is from one particular institute of sign-language learning, it provides needed information that can be used for future interventional plans by healthcare workers to address the potential overuse of muscular strain. Sign language institutions are considered the front-line providers of care for those interacting with the deaf community. Through a combination of data from both the medical and educational fields, there will be more integration and fewer communication barriers placed between the physical therapist and the deaf patient. (Donner et al., 2016; Holman et al., 2019; Punch, 2016; Smith et al., 2000; Yap et al., 2010)

## *Methods*

### *Participants and procedures*

The study started in February 2020 and ended in March 2020. The assessments were done for 2 weeks, from February until March. The study utilized an experimental research framework divided into two phases of interpreting results. The first phase involves the administration of pain scales to identify presence of pain within the participant base. From the first phase results comes the second phase, entailing the administration of the functional questionnaires to identify the potential areas and descriptions of pain which is of particular interest to the researcher. The respondents are strictly fully deaf participants, coming from the designated particular sign-language institution in Labangon, Cebu city, and finally capable of communicating in either FSL (Filipino Sign Language) or ASL (American Sign Language). Each respondent was guided with licensed FSL/ASL teachers to understand each assessment procedure both prior and along the course of action.

### *Data Analysis*

The implementation of the research commenced after the jury of the Southwestern University-PHINMA College of Rehabilitative Sciences approved of the proposal. The researcher submitted the transmittal letter to the designated research locale. During the first week of implementation, the researcher went to the sign language institution and explained the goals and importance of the research to both the Sign-language interpreters (who would aid in communicating the procedures and practitioner-patient interactions) and the respondents prior to giving the consent letter to participate. The respondents then under voluntary will, signed the consent letters given to them signifying their cooperation and awareness of the experiment on February 21, 2020. Following

the consent, all 80 participants underwent the paper copied pain scales and questionnaire assessments on February 21, 2020. The data collected then underwent interpretation and preparation of presentation for review from February 24, 2020 until March 9, 2020.

Upon acquisition of the consent letters from the respondents, the researcher began phase one of the experiment by administering the NTS (Numeric Rating Scale) and IPT (Iowa Pain Thermometer) respectively to each respondent to identify presence and intensity of pain and comprehension. Immediately after Phase 1, Phase 2 would commence, entailing the administering DASH (Disabilities of the Arm, Shoulder, and Hand Questionnaire) questionnaire to identify areas of pain specific to the study. After the DASH questionnaire has been submitted by the respondent after a timed duration of 30-45 minutes, the implementation is concluded.

Data from the collected instruments were entered into SPSS and tallied based on score and value. All data type error abided by the orthodox rules in which each assessment tool abides to therefore determined by value of presentation, in order to identify if there was a misunderstanding in communication.

### ***Results and Discussion***

The data from Phase 1 with the NRS/IPT comparison indicated a potential miscomprehension of the pain scale tools, which could have been due to the number-based format measurement and not the written description of pain. In the IPT also, 18% identified not experiencing any presence of pain versus the NRS, showing potential errors when taking the IPT as the standardized measuring

scale in accordance with the theoretical framework. There is a data trend in association of pain being mostly reported through the the 0-5 range on both the NRS and IPT indicating a common degree of pain experienced by the respondents despite the differences of the predominant identification of intensity of pain being felt.

The largest group of participants coming out identified as not experiencing pain (17.5%) from NRS. In comparison with the results of the word-based pain scale standard of the IPT, the largest group percentage coming out identified as having the presence of mild pain (20%). This is why there is a susceptible miscomprehension with the NRS tool usage with respondents that had questionable results, because of discrepancies found with identifying “no pain” on the NRS with “mild to severe” pain on the IPT.

In 2011, researchers of Udine University, Italy, experimented with deaf individuals to identify proposed pain scales that the researchers believed would be to communicate the best results with deaf individuals determined on the basis of appropriateness via psychometric evidence and review of literature by the researcher. The pain evaluation scales that were elected as the focus of the study by occurrence were the Numerical Rating Scale (NRS), VAS, Face Pain Scale (FPS), and the Iowa Thermometer Pain Scale (IPT). The NRS was met with confusion and IPT was ranked the highest in terms of comprehension by respondents once asked why some had different values when using the assessment tools. (Fellinger et al., 2010; Gordon, 2017; Kaye AD & Shah RV, 2014; Palese et al., 2011)

The data from Phase 2 indicated around 85% of respondents identified as having susceptible cases of overuse syndrome. Despite the pain scale identifying 18% with no identification of pain in

accordance with the IPT, the DASH revealed the lowest respondent rate of pain experienced, being only at 15%. The decrease in the percentile could be because of the pain experienced in a certain scenario which respondents believed manifested only when performing the activity asked.

The 85% correlated with grades higher than 29 on the DASH standard indicating a degree of musculoskeletal compromise and pain experienced when performing a certain activity. The results of this correlate with the hypothetical analysis that deaf individuals would have susceptible overuse syndrome. The degree of what type of overuse syndrome present could not be obtained, but the prevalence among the respondents that potentially experience a type of overuse syndrome was gathered through compiled scores and gradings as stated by the theoretical analysis.

The reasoning behind prevalence of upper extremity overuse syndrome within deaf individuals as indicated by the DASH was by cross analysis of the prevalence of such conditions upon sign-language interpreters/teachers. Pinpointing pain was one area of focus, but indicating the location of that pain broadened an underlying condition that brings a challenge to providers to a special population that has challenges in communicating those conditions properly. (Cassandra Chiu, 2017; *(No Title)*, n.d.; *Philippines Deaf Sign-Language Association.*, n.d.; Qin et al., 2008)

### ***Conclusion***

There is a presence of pain that the deaf respondents feel. According to the research, there is a high reliability in comprehension to the test taking among the responders. From this, the DASH results identified the specific area and type of pain each respondent identified with, and

unanimously discovered that there was a large percentage of susceptibility of overuse syndrome among deaf respondents.

### ***Acknowledgements***

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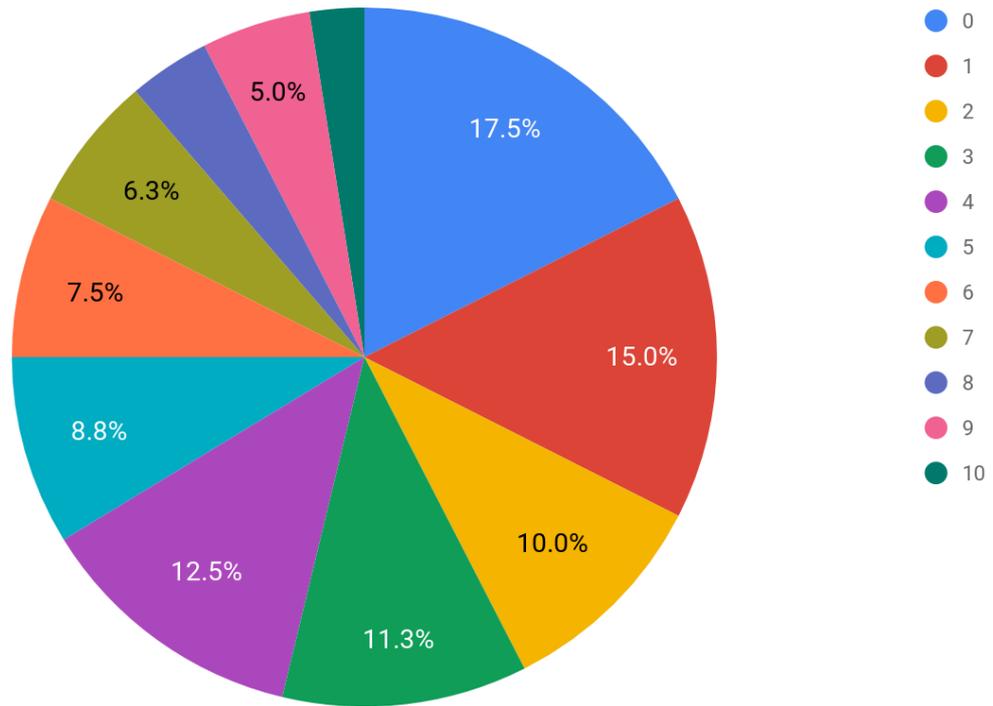
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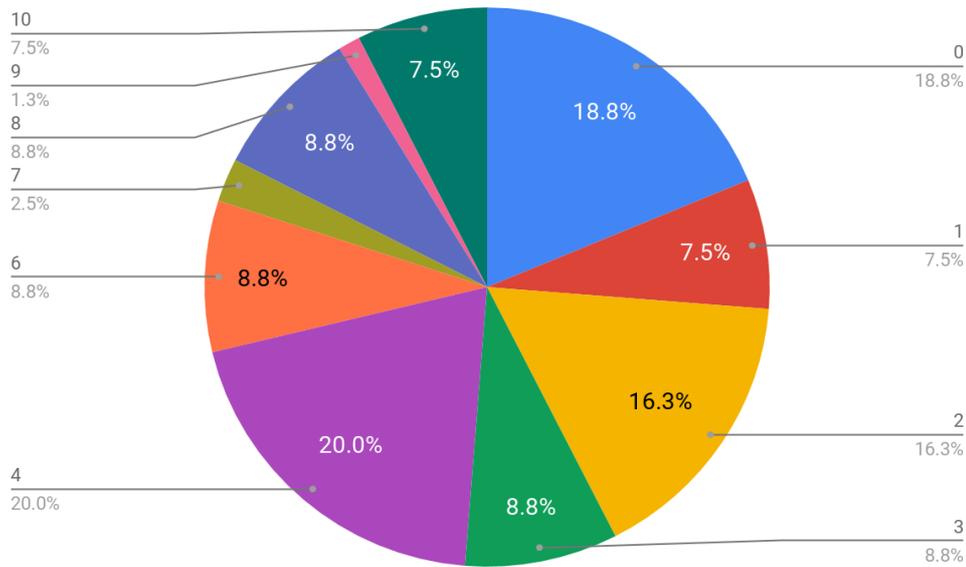
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#### ***Appendix A: Tables and Figures***

NRS:

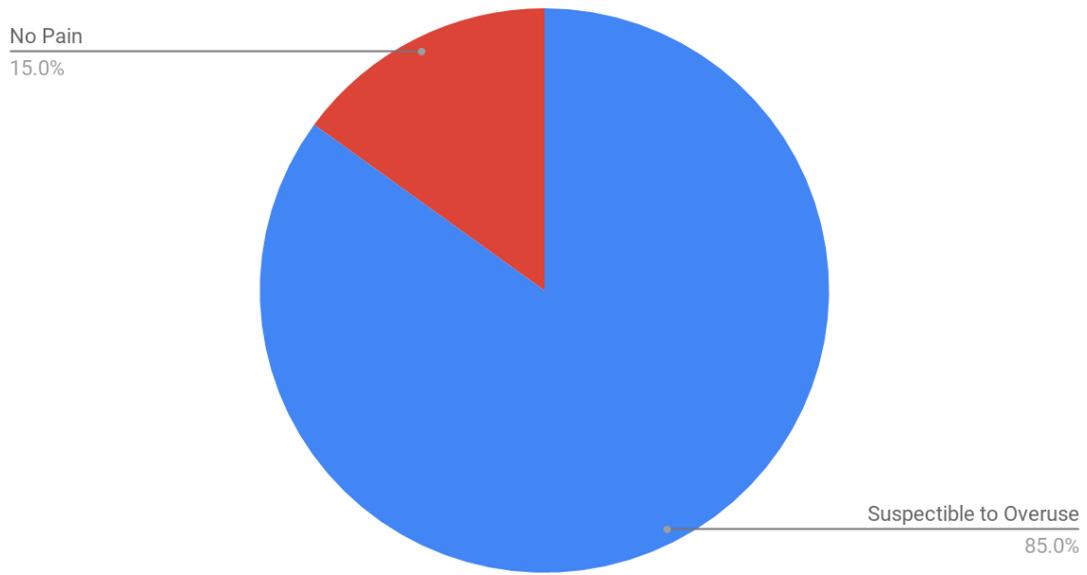


**IPT:**



**DASH:**

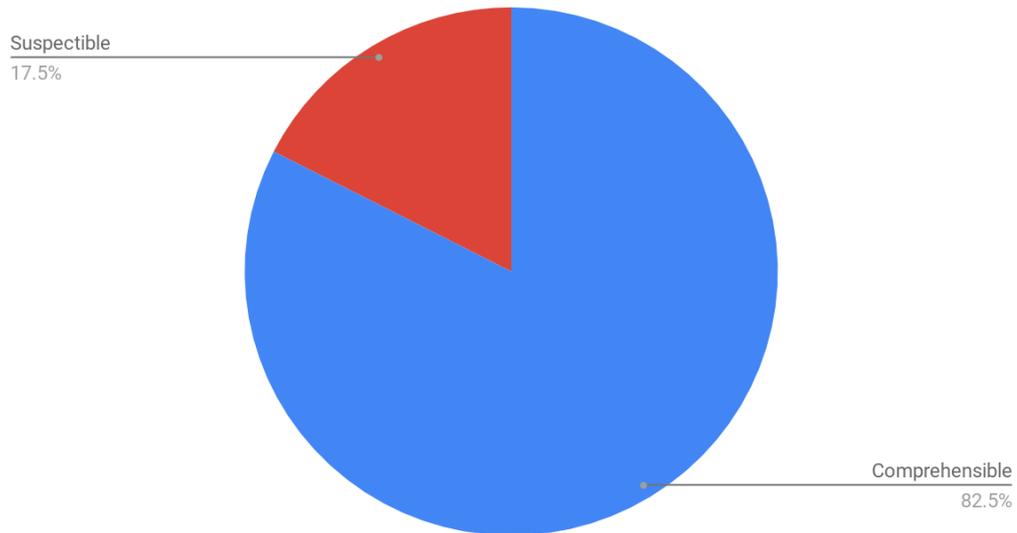
### DASH Culminated Score OUTPUT



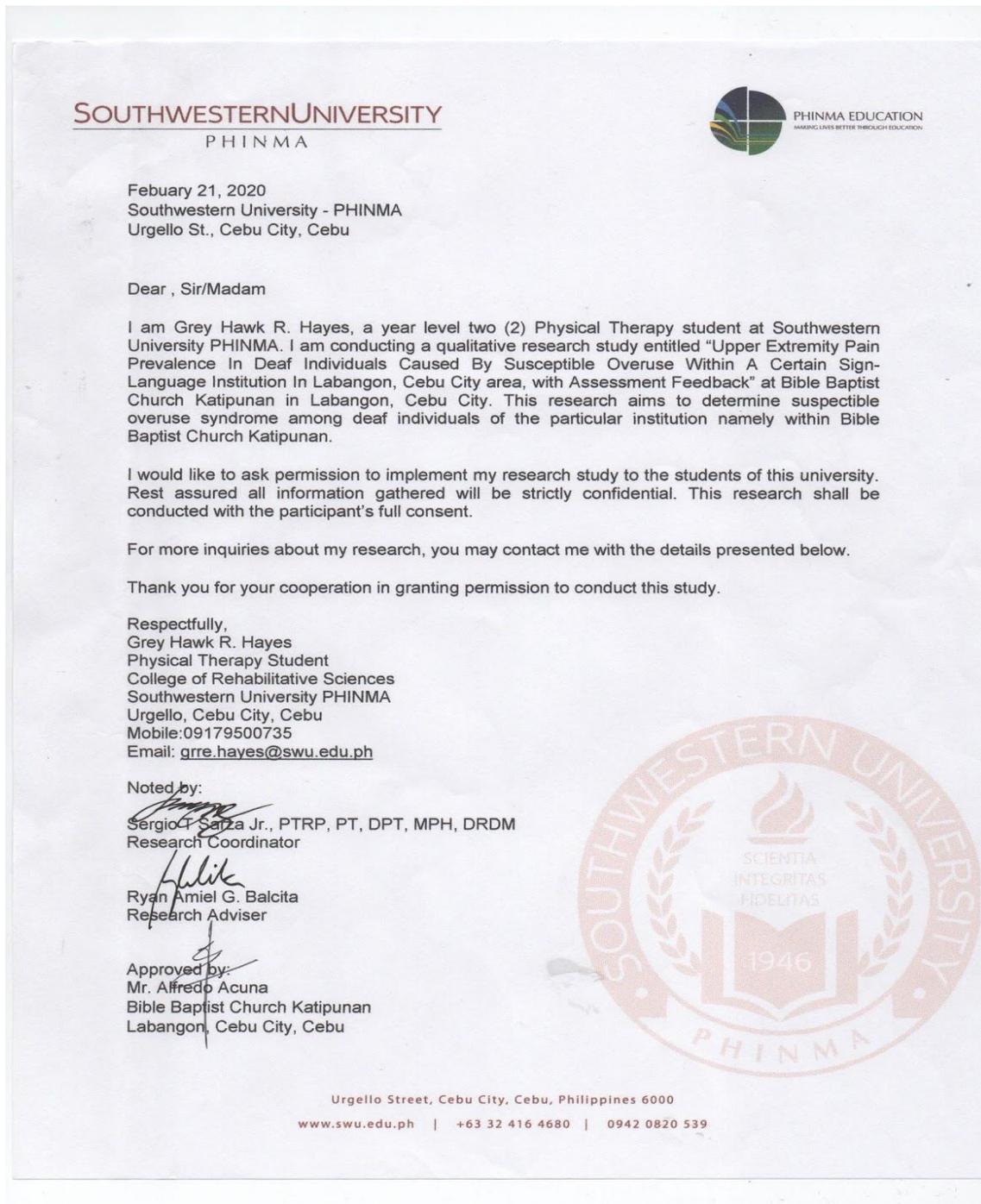
### Questionable/Comprehensible Respondents:



### Respondent Info



### *Appendix C: Communication and Certifications*



***Appendix D: Informed Consent Form***

Principal Investigator: Hayes, Grey Hawk R.

Researcher, College of Rehabilitative Sciences

Southwestern University PHINMA



This informed consent is for deaf students of the Bible Baptist Church Katipunan Deaf Institute who we are inviting to participate in the research project, “Upper Extremity Pain Prevalence In Deaf Individuals Caused By Susceptible Overuse Within A Certain Sign-Language Institution In Labangon, Cebu City area.”

This Informed Consent Form has two parts:

- **PART I:** Information Sheet (*to share information about the research project with you*)
- **PART II:** Certificate of Consent (*for signatures if you agree to take part*)

### *PART I: INFORMATION SHEET*

I am Hayes, Grey Hawk R., a BS-2 Physical Therapy Researcher in the College of Rehabilitative Sciences, Southwestern University PHINMA. I am conducting research on identifying the prevalence of overuse syndrome among the deaf population.

There may be some words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them of me, the study doctor or the staff.

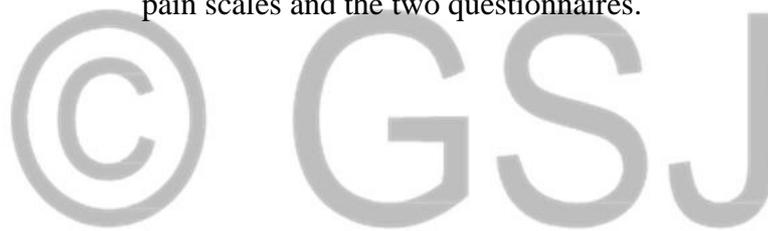
#### **Purpose of the Research Project**

Health-care professionals are constantly working to improve worker-patient communication, specifically how to better serve the deaf community. This study intends to identify prevalent susceptible signs of upper extremity strain within deaf individuals that could be affecting their quality of life through the use of assessment paper-based tools generally used for the common populace. The research will also provide an

epidemiological foundation for future research into interventions appropriate to address the data collected.

#### Type of Research Intervention

This research will involve identifying current level of pain in two pain scales, the Numerical Rating Scale & Iowa Pain Thermometer, followed by filling out one questionnaire the Disabilities of the Arm, Shoulder and Hand Questionnaire. If you decide to join, you shall participate in a 2-phased experiment which will be a 30-45 minute session that will require you to fill out the required testing tools e.g. the two pain scales and the two questionnaires.



#### Participant Selection

I am inviting all deaf students from the Labangon based sign-language institution of Bible Baptist Church Katipunan.

#### Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. Whether you choose to participate or not, all the services you may be currently receiving will continue and nothing will change.

If you choose not to participate in this research project, you will be offered the treatment that is routinely offered, and we will tell you more about it later. You may change your mind later and stop participating even if you agreed earlier.

### Information on the Intervention

You will be asked to identify your current level of pain with the Numerical Rating Scale, and the Iowa Pain Thermometer, followed by answering the Disabilities of the Arm, Shoulder, and Hand Questionnaire. These paper-based tools will help identify your current level of pain and functional capabilities. The sign-language interpreters will guide you along the process within the 30-45 minute of partaking in the research.

### Procedures and Protocol

During this research, you will be asked to:

1. Identify your current state of pain by rating the pain scales.
2. Put a check mark as to the questionnaire answer choices which best describe your pain and overall functionality.
3. Please be as honest/truthful as you can in answering.

### **Duration**

**The research is a one day implementation that will last for about 35-45 minutes for the participants to read comprehensively and answer. If you have any questions or concerns you might want to raise regarding this setup, feel free to ask me or tell me through the sign-language interpreter/teacher.**

### **Side Effects**

There are no side effects unless you have underlying conditions which could be hampered by answering paper-based evaluations within a 35-45 minute implementation. Please inform your sign-language interpreter/teacher if you have a condition which may prevent you from partaking in the research.

### **Risks**

There are no risks unless you have underlying conditions which could be hampered by answering paper-based evaluations within a 35-45 minute implementation. Please inform your sign-language interpreter/teacher if you have a condition which may prevent you from partaking in the research.

### **Benefits**

**Should the aims of this study be accomplished, this will benefit deaf individuals as to communicating the presence and area of pain experienced. It will also provide information for future research projects that may help identify treatment plans for the deaf and epidemiological significance.**

### **Reimbursements**

The sign-language interpreters provided are given a sum total of PHP1000.00 for their services in aiding the conduction of this research. In regards to the respondents of this research, each respondent may keep the black pen provided by the researcher.



### **Confidentiality**

The information that we collect from this research project will be kept confidential. Information about you that will be collected during the research will be put away and no one but the researchers will be able to see it. Any information about you will have a number on it instead of your name. Only the researchers will know what your number is and we will lock that information up with a lock and key. It will not be shared with or given to anyone except the College of Rehabilitative Sciences Research Coordinator.

### **Sharing the Results**

The knowledge that we get from doing this research will be shared with you through stakeholder and community meetings before it is made widely available to the public. Confidential information will not be shared. There will be small meetings in the participants and wider community and these will be announced. After these meetings, we will publish the results in order that other interested people may learn from our research.

### **Right to Refuse or Withdraw**

You do not have to take part in this research if you do not wish to do so and refusing to participate will not affect your treatment (if you are receiving any) in any way. You will still have all the benefits that you would otherwise have normally. You may stop participating in the research at any time that you wish without losing any of your rights as a patient. Your treatment (if receiving any) will not be affected in any way.

### **Who to Contact**

If you have any questions, you may ask them now or later, even after the study has started.

If you wish to ask questions later, you may contact me at: Hayes, Grey Hawk R., [grre.hayes@swu.edu.ph](mailto:grre.hayes@swu.edu.ph), 09179500735.

This proposal has been reviewed and approved by the **Southwestern University PHINMA Research Integrity Board**, which is the University's unit, whose task it is to make sure that research participants are protected from harm. If you wish to find about more about the Board, please contact the following:

Research Integrity Board Office  
University Library, 3rd Floor PHINMA Hall  
Southwestern University PHINMA  
Urgello Street, Sambag 2, Cebu City, Philippines 6000  
Mobile: +63 32 416 4682  
Email: [SWUResearchIntegrityBoard@gmail.com](mailto:SWUResearchIntegrityBoard@gmail.com)

## **PART II: CERTIFICATE OF CONSENT**

**I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.**

<hr/> <b>Signature over printed name</b> <b>Research Participant</b>	<hr/> <b>Date signed</b>
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**Statement by the Researcher/Person taking the Consent**

**I have accurately read out the aforementioned information sheet to the potential participant. I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.**

**A copy of this ICF has been provided to the participant.**

<hr/> <p style="text-align: center;"><b>Signature over printed name</b></p> <p><b>Researcher/Person taking the Consent</b></p>	<hr/> <p style="text-align: center;"><b>Date signed</b></p>
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### **Appendix E: Research Budget**

This research project is entirely self-funded by the researcher, with no sources of external funding from any private or public agency or institution. The researcher also does not have any official affiliation with any private or public agency or institutions that may conflict interest in the conduct of this project.

Quantity	Budget	Unit Price	Amount
720- Paper Copies	PHP720.00	PHP1.00	PHP720.00
2 - Staple Wires	PHP100.00	PHP50.00	PHP100.00
1- Japanese Paper	PHP3.00	PHP3.00	PHP3.00
4 - Envelope	PHP12.00	PHP3.00	PHP12.00
1 - Stapler	PHP50.00	PHP50.00	PHP50.00
16 - Print Copy	PHP32.00	PHP2.00	PHP32.00
80 - Black Pens	PHP800.00	PHP10.00	PHP800.00
2 - SLI Service	PHP1000.00	PHP500.00	PHP1000.00
2 - Jeep Travel	PHP16.00	PHP8.00	PHP16.00
		<b>Total (in PHP)</b>	<b>PHP2,733.00</b>

## Appendix H: Documentation



GSJ