

## ACCEPTABILITY OF VIBRATION DEVICE FOR LOW BACK PAIN AMONG PHYSICAL THERAPISTS

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### ABSTRACT

Low back pain, particularly in the lumbar region, is a pervasive global health issue, posing a significant burden on individuals, healthcare systems, and economies. According to Wu et al. (2020), it is the leading cause of disability globally, affecting people of all ages, ethnic backgrounds, and socioeconomic statuses. As stated by the World Health Organization (WHO) categorizes it as a major contributor to years lived with disability (YLD), emphasizing its substantial socioeconomic implications. Notably, Low Back Pain (LBP) is not confined to a specific age group, with children, adolescents, and individuals of all ages susceptible to its impact. The researchers aim to shed light on the acceptability of the Vibration Device among Physical Therapists in the realm of low back pain management. The study aims to contribute valuable insights into the practicality and user satisfaction of incorporating a vibration device into therapeutic practices. The emphasis on acceptability aligns with a wider goal of understanding non-invasive interventions, prioritizing their role in enhancing pain relief and elevating overall quality of life, thereby making a substantial impact in clinical settings. The Methodology of the study used a quantitative research design, specifically a survey design by Bhandari (2020). The process of gathering and interpreting numerical data is referred to as quantitative research. It can be used to identify patterns and averages, formulate hypotheses, examine relationships, and generalize findings to larger populations. With this design, the researchers conducted their studies and gathered data using surveys that provide open-ended questions that can be answered using the Likert scale. The result of the overall acceptability of the device has a mean of 3.86 which has a verbal interpretation of moderately acceptable according by Salac, D. (2020). This is based on the sub-problems of appearance, quality, safety, ease of use, and usefulness. The results of the study have concluded that the device is accepted by the physical therapists for implementation in the realm of low back pain management.

**Keywords:** Vibration Device, Low Back Pain, Physical Therapist, Vibration Therapy

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## INTRODUCTION

Low back pain, particularly in the lumbar region, is a pervasive global health issue, posing a significant burden on individuals, healthcare systems, and economies. According to Wu et al. (2020), it is the leading cause of disability globally, affecting people of all ages, ethnic backgrounds, and socioeconomic statuses. As stated by the World Health Organization (WHO) categorizes it as a major contributor to years lived with disability (YLD), emphasizing its substantial socioeconomic implications. Notably, Low Back Pain (LBP) is not confined to a specific age group, with children, adolescents, and individuals of all ages susceptible to its impact. A ubiquitous experience, most people have encounter LBP at some point in their lives. The incidence peaks around the age of 50–55 years, with women more frequently affected than men. Strikingly, the prevalence and disability ramifications of LBP reach their zenith among the elderly, particularly in the 80–85 years age group. Compounding the issue, recurrent episodes of LBP become increasingly common with advancing age, underscoring the persistent and escalating nature of this global health concern (WHO, 2023).

In addressing this challenge, the vibration band emerges as a non-invasive intervention. This wearable device employs targeted focal muscle vibration to alleviate low back pain at its source, offering vibration with ergonomic comfort. Its non-invasive nature sets it apart from traditional interventions, providing a user-centric approach that empowers individuals to manage their pain effectively. The researchers aim to shed light on the acceptability of the Vibration Device among Physical Therapists in the realm of low back pain management. This exploration primarily focused on subjective aspects, including appearance, quality, safety, ease of use, and usefulness, gauging the overall acceptability through surveys. By emphasizing these aspects, the study aims to contribute valuable insights into the practicality and user satisfaction of incorporating a vibration device into therapeutic practices. The emphasis on acceptability aligns with a wider goal of understanding non-invasive interventions, prioritizing their role in enhancing pain relief and elevating overall quality of life, thereby making a substantial impact in clinical settings.

## LITERATURE REVIEW

Based on several studies assessing various societal and occupational groups, the literature promoting the vibration device for low back pain has demonstrated favorable outcomes in terms of alleviated pain and rehabilitation. The next theme is low back pain. Research indicates that from 1990 to 2019, the impact of low back pain increased. One such study, conducted by Wu et al. (2020), revealed that the number of people affected by low back pain increased from 42.5 million to 568.4 million in a short period of time. Numerous research have demonstrated methods for reducing pain, and a study by Caputo et al. (2022) found that vibration treatment was another effective method for reducing pain while also enhancing physical performance. Two groups—one using vibration and the other not—were compared in a study on vibration that focused on the lumbar spine kinematics during sit-to-stand exercises. Each of the 36 training sessions that both groups went through included six exercises. According to Jung et al. (2020), this study demonstrates that vibration effectively improves pain, proprioception, and lumbar spine kinematics during sit-to-stand exercises in adolescents. Feng et al. (2022) provided evidence to bolster the earlier study by demonstrating that, in comparison to the non-treated group, targeted vibration treatment after 8 weeks resulted in a substantial improvement in discomfort, walking posture, and gait. Ghazi et al. (2021) used four vibration therapy devices in their investigation. The results demonstrated that the focal vibration frequency and amplitude effective ranges were

discovered. This demonstrates how crucial it is to understand the vibration environment—whether it is unrestricted or restricted—while citing vibration characteristics. Lastly, the topic of multi-actuator devices' inconsistent output is covered. The development of focal vibration protocols and maybe improved focal vibration devices is guided by these results. Although this relates more to vibration treatment, a research by Martin (2021) found that handheld percussion massagers such as the Hypervolt or Theragun TM can also help with pain relief, release of tight areas, and increased mobility. In addition, a study by Luo et al. (2012) examined the benefits of vibration therapy during training and found that vibration in addition to traditional resistance training improves power and strength. A study conducted in 2023 by Hassan et al. also revealed that adding vibrations to a traditional training program might increase physical strength by 5% to 42% and improve skill development by 21% to 81%. The most promising study on vibration therapy and its advantages found in relevant literature is the one conducted by Li et al. in 2023. According to the results of their 860-person study, vibration therapy can help CLBP sufferers feel less pain and have better lumbar function. The researchers' chosen methodology for the study is supported by the literature in the section on methodological support.

## METHODOLOGY

The respondents of the study, the subject were chosen based on the following criteria: A Licensed Physical Therapist in the Philippines with a minimum of 1 year worth of experience and actively practicing in rehabilitation centers, hospitals, or homecare located within the cities of San Pedro, Biñan, and Santa Rosa within the Laguna region. Those are willing to participate in the study. A minimum of thirty (30) physical therapists made up the study's respondents. The study used quantitative research design, specifically survey design. The research made use of a questionnaire to collect the needed primary data. The instrument that was prepared primarily focused on answering the statement of the problem. The questionnaire contains six (6) main sections, namely, appearance, quality, safety, ease of use, usefulness, and overall acceptability with five (5) sub-questions in each of the first five (5) main questions. The researchers believed that the questionnaire answered the previously determined problems provided in the statement of the problem of the study. The researchers measured the acceptability of the device by letting the respondents answer a questionnaire answered by a Likert scale. The general weighted mean will be the statistical treatment used in the study.

## RESULTS

Table 1 shows the gathered results in mean, ranking, and verbal interpretation of the questions in the level of acceptability based on appearance.

**Table 1**  
**Respondents' Level of Acceptability in terms of Appearance**

	Weighted Mean	Standard Deviation	Verbal Interpretation	Rank
1. The device has a good structure.	3.91	0.88	Moderately Acceptable	3
2. The aesthetic appearance of the device is pleasing.	3.97	0.88	Moderately Acceptable	2
3. The appearance fully reflects the description of the device.	3.85	0.67	Moderately Acceptable	4
4. The appearance matches the clinical setting.	3.73	1.13	Moderately Acceptable	5
5. The important features are highlighted in the design.	4.00	1.03	Moderately Acceptable	1
<b>Mean</b>	<b>3.89</b>		<b>Moderately Acceptable</b>	

The questions are ordered in descending order according to the acceptability level based on appearance. Question number 5 is ranked first with a mean of **4.00**, followed by question number 2 with a mean of **3.97**, question number 1 with a mean of **3.91**, question number 3 with a mean of **3.85**, and question number 4 with a mean of **3.73**, resulting to a total mean score of **3.88**

Table 2 shows the gathered results in mean, ranking, and verbal interpretation of the questions in the level of acceptability based on quality.

**Table 2**  
**Respondents' Level of Acceptability in terms of Quality**

	Weighted Mean	Standard Deviation	Verbal Interpretation	Rank
1. The device has good material.	3.94	0.93	Moderately Acceptable	2.5
2. The device is ergonomically designed.	3.67	0.85	Moderately Acceptable	4
3. The device is comfortable when worn.	4.12	0.93	Moderately Acceptable	1
4. This device is applicable for exercises.	3.18	1.29	Acceptable	5
5. The device fulfills its designated function.	3.94	0.83	Moderately Acceptable	2.5
<b>Mean</b>	<b>3.77</b>		<b>Moderately Acceptable</b>	

The questions are ordered in descending order according to the acceptability level based on appearance. Question number 3 is ranked first with mean **4.12**, followed by questions 1 and 5 with a mean of **3.94**, question 2 with a mean **3.67**, and question 4 with a mean of **3.18**, resulting in a total mean score of **3.77**.

Table 3 shows the gathered results in mean, ranking, and verbal interpretation of the questions in the level of acceptability based on safety.

**Table 3**  
**Respondents' Level of Acceptability in terms of Safety**

	Weighted Mean	Standard Deviation	Verbal Interpretation	Rank
1. The device is safe to use as a therapist.	4.09	0.98	Moderately Acceptable	1
2. The device is safe to use as a patient.	3.97	1.05	Moderately Acceptable	2
3. I find the device secure to wear.	3.94	0.90	Moderately Acceptable	3
4. The device is safe to use in prolonged use.	3.52	1.03	Moderately Acceptable	5
5. The components of the device are secured.	3.88	1.05	Moderately Acceptable	4
<b>Mean</b>	<b>3.88</b>		<b>Moderately Acceptable</b>	

The questions are ordered in descending order according to the acceptability level based on appearance. Question number 1 is ranked first with a mean of **4.09**, followed by question number 2 with a mean of **3.97**, question number 3 with a mean of **3.94**, question number 5 with a mean of **3.88**, and question number 4 with a mean of **3.52**, resulting in a total mean score of **3.88**.

Table 4 shows the gathered results in mean, ranking, and verbal interpretation of the questions in the level of acceptability based on ease of use.

**Table 4**  
**Respondents' Level of Acceptability in terms of Ease of Use**

	Weighted Mean	Standard Deviation	Verbal Interpretation	Rank
1. I find this product easy to use.	4.45	0.71	Highly Acceptable	1
2. I find this device easy to use during treatments.	4.12	1.02	Moderately Acceptable	3.5
3. The device's instructions are clear and understandable.	4.12	1.11	Moderately Acceptable	3.5
4. Maintenance of the device is easy.	3.97	1.07	Moderately Acceptable	5
5. I find this device easy to be skillful at using.	4.15	1.00	Moderately Acceptable	2
<b>Mean</b>	<b>4.16</b>		<b>Moderately Acceptable</b>	

The questions are ordered in descending order according to the acceptability level based on appearance. Question number 1 is ranked first with a mean of **4.45**, followed by question number 5 with a mean of **4.15**, questions number 2 and 3 with a mean of **4.12**, and question number 4 with a mean of **3.97**, resulting in a total mean score of **4.16**.

Table 5 shows the gathered results in mean, ranking, and verbal interpretation of the questions in the level of acceptability based on usefulness.

**Table 5**  
**Respondents' Level of Acceptability in terms of Usefulness**

	Weighted Mean	Standard Deviation	Verbal Interpretation	Rank
1. Using this device will help me to accomplish treatments.	3.64	1.19	Moderately Acceptable	1
2. I find this device can help improve my job performance.	3.52	1.28	Moderately Acceptable	5
3. Using this device would increase my productivity.	3.58	1.03	Moderately Acceptable	3
4. Using this device would make it easier to do my job.	3.61	1.00	Moderately Acceptable	2
5. I find this device useful in my line of work.	3.55	1.25	Moderately Acceptable	4
<b>Mean</b>	<b>3.58</b>		<b>Moderately Acceptable</b>	

The questions are ordered in descending order according to the acceptability level based on appearance. Question number 1 is ranked first with a mean **3.64**, followed by question number 4 with a mean **3.61**, question number 3 with a mean **3.58**, question number 5 with a mean **3.55**, and question number 2 with a mean **3.52**, bringing the total mean to **3.58**.

Table 6 shows the gathered results in mean, ranking, and verbal interpretation of the questions in the level of acceptability of the device.

**Table 6**  
**Respondents' Level of Overall Acceptability**

	Weighted Mean	Verbal Interpretation	Rank
Appearance	3.89	Moderately Acceptable	1
Quality	3.77	Moderately Acceptable	5
Safety	3.88	Moderately Acceptable	3
Ease of Use	4.16	Moderately Acceptable	2
Usefulness	3.58	Moderately Acceptable	4
<b>Mean</b>	<b>3.86</b>	<b>Moderately Acceptable</b>	

Table 6: The overall acceptability is interpreted as moderately acceptable with all the sub-problems being factored in which tells that it can be considered for an effectiveness study in the future.

## DISCUSSION

This study aimed to determine whether the vibration device that the researchers have fabricated will be acceptable to licensed physical therapists as an alternative modality in the specified population of patients with low back pain. The findings of the study are enumerated as follows: In terms of appearance, the level of acceptability is moderately acceptable with a weighted mean of 3.89 (Moderately Acceptable). In terms of quality, the level of acceptability is moderately acceptable with a weighted mean of 3.77 (Moderately Acceptable). In terms of safety, the level of acceptability is moderately acceptable with a weighted mean of 3.88



(Moderately Acceptable). In terms of ease of use, the level of acceptability is moderately acceptable with a weighted mean of 4.16 (Moderately Acceptable). In terms of usefulness, the level of acceptability is moderately acceptable with a weighted mean of 3.58 (Moderately Acceptable). And lastly in terms of overall acceptability, the level of acceptability is moderately acceptable with a weighted mean of 3.86 (Moderately Acceptable). The results of the overall acceptability of the study with all the sub-problems being factored presents a positive result in considering the study an effectiveness study in the future. The participants have had mostly positive response towards the device with the very straightforward, highly user-friendly, and simple to instruct patients on, particularly for physical therapists. The device is safe to use because its components are safely encased inside the casing, which would not pose any potential hazard. Additionally, there are few to no sharp edges on the device that could cause cuts or puncture wounds to users. Aside from the design and components of the device, the device does not really pose any threats as a vibration device.

The following recommendations for possible actions are made: Emphasize features in a user manual to ensure users understand the device's functionality and benefits. Maintain a focus on comfort in future iterations of the device, prioritizing ergonomic design and materials to enhance user satisfaction. Conduct further safety assessments and certifications to validate its safety profile in national standards, ensuring user confidence and regulatory compliance. Further improve the user interfaces and instructional materials to facilitate user adapting to the device and minimize user error.

## CONCLUSIONS

1. The device is generally considered moderately acceptable in terms of appearance, with respondents highlighting that important features are adequately highlighted in the design.
2. Respondents perceive the quality of the device as moderately acceptable, with particular emphasis on the comfort experienced when wearing it.
3. The device is viewed as moderately acceptable in terms of safety, with respondents expressing confidence in its safety for use as a therapist.
4. Respondents find the device moderately acceptable in terms of ease of use, with a significant proportion finding it easy to use.
5. While the device is perceived as moderately acceptable in terms of usefulness, respondents acknowledge its potential in aiding treatment processes.
6. Overall, the device is rated as moderately acceptable, with ease of use being a key factor contributing to its acceptability.

## ACKNOWLEDGEMENTS

The researchers would like to sincerely thank the following for helping to make the thesis possible, to begin by expressing appreciation to the Good Lord, for providing the strength, confidence, and insight to pursue this study.

To University of Perpetual Help - Dr. Jose G. Tamayo Medical University, for being the second home that teaches to be Christian professionals. To Dean, John P. Lumagui, PTRP, MAEd, MSCPD, for the continual support and leadership and for being a compassionate patriarch of our College Department. To our research professor, Stephanie Piol, PTRP, MSCPD, DPT, for teaching the procedures and basics of research writing. To Dr. Noel R. San Antonio, PTRP, DPT, for giving valuable and innovative insights, feedback and helpful

suggestions that improved the research for it to be considered for publication. To the researchers adviser, Manuel Alejandro R. Gonzalez IV, PTRP, DPT for offering advice, helpful comments and recommendations that lead on to accomplishing the goals and objectives of this thesis.

Finally, to the researchers cherished parents, fellow classmates, instructors, and friends—thank you for your unwavering support and inspiration to aim higher. Thank you for your moral, emotional, and financial support. Without all of you, this would not have been able to be possible. You all contributed significantly to this success. The researchers sincerely appreciate your help and thank you very much.

## REFERENCES

- Alghadir, A. H., Omar, S. H., Al-Askar, S. H., & Iqbal, Z. A. (2018). Effect of localised vibration on muscle strength in healthy adults: A systematic review. *Saudi Journal of Sports Medicine*, 18(1), 1–10. Retrieved from <https://www.sciencedirect.com/science/article/abs/pii/S0031940617300780>
- Aminian-Far, A., Hadian, M. R., Olyaei, G., Talebian, S., Bakhtiary, A. H., & Kazemnejad, A. (2011). Whole-body vibration and the prevention and treatment of delayed-onset muscle soreness. *Journal of Athletic Training*, 46(1), 43–50. Retrieved from <https://meridian.allenpress.com/jat/article/46/1/43/111177/Whole-Body-Vibration-and-the-Prevention-and>
- Bhandari, P. (2023). *What is quantitative research? | Definition, uses & methods*. Scribbr. Retrieved from <https://www.scribbr.com/methodology/quantitative-research/>
- Bhandari, P., & Nikolopoulou, K. (2020). *What is a Likert scale? | Guide & examples*. Scribbr. Retrieved from <https://www.google.com/search?q=https://www.scribbr.com/methodology/likert-scale/%23:~:text%3DA%2520Likert%2520scale%2520is%2520a,about%2520the%2520statement%2520or%2520question>
- Bonanni, R., Cariati, I., Romagnoli, C., D'Arcangelo, G., Annino, G., & Tancredi, V. (2022). Whole body vibration: A valid alternative strategy to exercise? *Sports*, 7(4), 99. <https://www.google.com/search?q=https://doi.org/10.3390/sports7040099>
- Caputo, M., Bellia, G., & Castelli, M. (2022). Vibration Therapy for Health Promotion. IntechOpen. Retrieved from <https://www.intechopen.com/chapters/82022>
- Chu, W., Wang, Q., Chu, M., Chen, Y., Liu, Y., Sun, Y., ... & Li, Q. (2022). Long-term effect of vibration therapy for training-induced muscle fatigue in elite athletes. *Frontiers in Physiology*, 13, 914344. <https://www.google.com/search?q=https://doi.org/10.3389/fphys.2022.914344>
- Cochrane, D. J. (2019). The inclusion of vibration therapy in rehabilitating a gastrocnemius tear: A case study in master athlete. *Journal of Physical Therapy Science*, 31(9), 738–742. <https://doi.org/10.1589/jpts.31.738>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. Retrieved from [https://www.researchgate.net/publication/200085965\\_Perceived\\_Usefulness\\_Perceived\\_Ease\\_of\\_Use\\_and\\_User\\_Acceptance\\_of\\_Information\\_Technology](https://www.researchgate.net/publication/200085965_Perceived_Usefulness_Perceived_Ease_of_Use_and_User_Acceptance_of_Information_Technology)
- Feng, R., Wang, X. Y., Pan, F., Zhang, Y., Zhang, H., & Zhang, J. (2022). Effect of local vibration therapy on gait of patients with chronic nonspecific low back pain. *Chinese Manipulation and Rehabilitation Medicine*, 13(7), 615–619. Retrieved from <http://kns.cnki.net/kcms/detail/detail.aspx?doi=10.19787/j.issn.1008-1879.2022.07.003>



- Ghazi, M., Rippetoe, J., Chandrashekhar, R., & Wang, H. (2021). Focal vibration therapy: Vibration parameters of effective wearable devices. *Applied Sciences*, 11(7), 2969. <https://doi.org/10.3390/app11072969>
- Hassan, A., Zahran, K., & Ahmed, M. (2023). The effect of using vibration training on some physical and skill variables in basketball players. *The Alexandria Journal of Sports Science*, 20(1), 1–12. Retrieved from <https://aassjournal.com/article-1-1126-en.html>
- Hyman, M. (2005). *Looking good matters for devices, too*. MDDI Online. Retrieved from [https://www.mddionline.com/digital-health/looking-good-matters-for-devices-too?fbclid=IwZXh0bgNhZW0CMATAAR0MvQ63YdIEUbnFqKWAgqAIRtf-5sZaKkstsLjLDu5ygrcz2C6kTYfzSjA\\_aem\\_AQRdEygac3Q9cYimC76ppjpNihQqT1aDCe5F0QFzrRAJbwsf6Q8\\_S3TSGeHHXm8wn0\\_GXeHCD\\_qojNKtB5To\\_jq](https://www.mddionline.com/digital-health/looking-good-matters-for-devices-too?fbclid=IwZXh0bgNhZW0CMATAAR0MvQ63YdIEUbnFqKWAgqAIRtf-5sZaKkstsLjLDu5ygrcz2C6kTYfzSjA_aem_AQRdEygac3Q9cYimC76ppjpNihQqT1aDCe5F0QFzrRAJbwsf6Q8_S3TSGeHHXm8wn0_GXeHCD_qojNKtB5To_jq)
- Jemala, M. (2021). Long-term research on technology innovation in the form of new technology patents. *Procedia Computer Science*, 192, 1689–1698. <https://www.google.com/search?q=https://doi.org/10.1016/j.procs.2021.08.173>
- Jung, K., Jung, J., In, T., & Cho, H. (2020). The effectiveness of trunk stabilization exercise combined with vibration for adolescent patients with nonspecific low back pain. *International Journal of Environmental Research and Public Health*, 17(19), 7024. <https://doi.org/10.3390/ijerph17197024>
- Jung, S., & Ha, S. (2020). Effects of local vibration on shoulder horizontal adduction and internal rotation range of motion in subject with posterior shoulder tightness. *Journal of Musculoskeletal Science and Technology*, 44(6), 410–415. Retrieved from [https://www.researchgate.net/publication/347588441\\_Effects\\_of\\_Local\\_Vibration\\_on\\_S\\_houlder\\_Horizontal\\_Adduction\\_and\\_Internal\\_Rotation\\_Range\\_of\\_Motion\\_in\\_Subject\\_t\\_with\\_Posterior\\_Shoulder\\_Tightness](https://www.researchgate.net/publication/347588441_Effects_of_Local_Vibration_on_S_houlder_Horizontal_Adduction_and_Internal_Rotation_Range_of_Motion_in_Subject_t_with_Posterior_Shoulder_Tightness)
- Kahere, M., Pillay-van Wyk, V., Jinabhai, C. C., & Gqaleni, N. (2022). A scoping review on the epidemiology of chronic low back pain among adults in Sub-Saharan Africa. *Pain and Therapy*, 11(2), 449–472. <https://www.google.com/search?q=https://doi.org/10.1007/s40122-022-00374-7>
- Li, Q., Liu, P., Wang, Z., & Li, X. (2023). Vibration therapy<sup>1</sup> to improve pain and function in patients with chronic low back pain: A systematic review and meta-analysis. *BMC Musculoskeletal Disorders*, 24(1), 375. <https://doi.org/10.1186/s13018-023-04217-2>
- Luo, J., McNamara, B., & Moran, K. (2005). The use of vibration training to enhance muscle strength and power. *Sports Medicine*, 35(1), 23–41. <https://doi.org/10.2165/00007256-200535010-00003>
- Lupowitz, L. (2022). Vibration therapy – A clinical commentary. *International Journal of Sports Physical Therapy*, 17(6), 1029–1031. <https://doi.org/10.26603/001c.36964>
- Marikyan, H., & Papagiannidis, S. (2023). *Technology acceptance model: A review*. Open Newcastle University. Retrieved from [https://www.google.com/search?q=https://open.ncl.ac.uk/theories/1/technology-acceptancemodel/%3Ffbclid%3DIwZXh0bgNhZW0CMATAAR1E1cHMZ6D6knSU6PdQBDWy7YK4I8vGsMevkM1uXLUxkeLIHIUdCxgb-8\\_aem\\_AQTfdnmgVr6\\_Id7kSSWpxMqecEgl-ijk3cgeScayX\\_eX3XGpDm\\_78UrJv9pJkpWIFK0dTcXj\\_h7\\_1f4EyOO9HuM](https://www.google.com/search?q=https://open.ncl.ac.uk/theories/1/technology-acceptancemodel/%3Ffbclid%3DIwZXh0bgNhZW0CMATAAR1E1cHMZ6D6knSU6PdQBDWy7YK4I8vGsMevkM1uXLUxkeLIHIUdCxgb-8_aem_AQTfdnmgVr6_Id7kSSWpxMqecEgl-ijk3cgeScayX_eX3XGpDm_78UrJv9pJkpWIFK0dTcXj_h7_1f4EyOO9HuM)
- Martin, J. (2021). *A critical evaluation of percussion massage gun devices as a rehabilitation tool focusing on lower limb mobility: A literature review*. ResearchGate. Retrieved from [https://www.researchgate.net/publication/348636056\\_A\\_critical\\_evaluation\\_of\\_percussion\\_massage\\_gun\\_devices\\_as\\_a\\_rehabilitation\\_tool\\_focusing\\_on\\_lower\\_limb\\_mobility\\_A\\_literature\\_review](https://www.researchgate.net/publication/348636056_A_critical_evaluation_of_percussion_massage_gun_devices_as_a_rehabilitation_tool_focusing_on_lower_limb_mobility_A_literature_review)

- McLeod, S. (2023). *Questionnaire: Definition, examples, design and types*. Simply Psychology. Retrieved from <https://www.simplypsychology.org/questionnaires.html>
- Nikolopoulou, K. (2023). *What is purposive sampling? | Definition & examples*. Scribbr. Retrieved from <https://www.scribbr.com/methodology/purposive-sampling/>
- Philippines. (n.d.). Physiopedia. Retrieved from <https://www.physio-pedia.com/Philippines>
- Physical Therapy & Sports Medicine. (2022). *Vibration therapy*. Retrieved from <https://getbacktothegameoflife.com/vibration-therapy/>
- Safarik, P. (2018). *Vibration therapy and its influence on health*. ResearchGate. Retrieved from [https://www.researchgate.net/profile/Ivan-Uher/publication/329147346\\_Vibration\\_Therapy\\_and\\_Its\\_Influence\\_on\\_Health/links/5cd2856ca6fdccc9dd93a494/Vibration-Therapy-and-Its-Influence-on-Health.pdf](https://www.researchgate.net/profile/Ivan-Uher/publication/329147346_Vibration_Therapy_and_Its_Influence_on_Health/links/5cd2856ca6fdccc9dd93a494/Vibration-Therapy-and-Its-Influence-on-Health.pdf)
- Salac, R. (2020). *Likert scale for the level of acceptability and satisfaction*. ResearchGate. Retrieved from [https://www.researchgate.net/figure/Likert-Scale-for-the-Level-of-Acceptability-and-Satisfaction\\_tbl3\\_346614290](https://www.researchgate.net/figure/Likert-Scale-for-the-Level-of-Acceptability-and-Satisfaction_tbl3_346614290)
- Taylor, S. (2023). *Weighted mean*. Corporate Finance Institute. Retrieved from <https://corporatefinanceinstitute.com/resources/data-science/weighted-mean/>
- Thompson, W. R., Rubinacci, A., & Мии, М. (2015). Vibration therapy: Clinical applications in bone. *Current Osteoporosis Reports*, 13(2), 111–119. <https://www.google.com/search?q=https://doi.org/10.1007/s11914-015-0260-z>
- University of St. Augustine for Health Sciences. (2021). *Accolades*. Retrieved from [https://www.usa.edu/wp-content/uploads/2022/12/Accolades\\_Summer2022-Final.pdf](https://www.usa.edu/wp-content/uploads/2022/12/Accolades_Summer2022-Final.pdf)
- World Health Organization. (2023). *Low back pain*. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/low-back-pain>
- Wu, A., Wei, Y., Chen, J., Zeng, X., Yin, Z., Liu, G., ... & Chen, H. (2020). Global low back pain prevalence and years lived with disability from 1990 to 2017: Estimates from the Global Burden of Disease Study 2017. *Annals of Translational Medicine*, 8(6), 299. <https://doi.org/10.21037/atm.2020.02.175>
- Yang, J., & Seo, D. (2015). The effects of whole body vibration on static balance, spinal curvature, pain, and disability of patients with low back pain. *Journal of Physical Therapy Science*, 27(3), 805–808. <https://doi.org/10.1589/jpts.27.805>
- Yin, S., Zhang, X., Chen, S., Liu, W., Zhang, Y., & Fan, Y. (2022). Local vibration therapy promotes the recovery of nerve function in rats with sciatic nerve injury. *Journal of Orthopaedic Translation*, 34, 1–9. <https://doi.org/10.1016/j.jot.2022.02.002>
- Zhang, Y., Hu, H., Zeng, X., Liu, Y., Huang, M., & Chen, H. (2021). Effect of whole-body vibration training on muscle activation for individuals with knee osteoarthritis. *Journal of Healthcare Engineering*, 2021, 6633716. <https://www.google.com/search?q=https://doi.org/10.1155/2021/6633716>