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PROCEEDINGS

The 4th International Conference on Sustainable Innovation (ICoSI) 2020

Cutting Edge Innovations for Sustainable Development Goals

Universitas Muhammadiyah Yogyakarta (Indonesia)
October 13 - 14 2020

https://icosi.umy.ac.id/

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Preface by the Chairperson of the 4th ICoSI 2020

Dr. Yeni Rosilawati, S.IP. S.E., MM.

Assalamu'alaikum Wr. Wb.

All praise is due to Allah, the Almighty, on whom we depend for sustenance and guidance. Prayers and peace be upon our Prophet, Muhammad SAW, his family and all of his companions.

On behalf of the organizing committee, it is my pleasure and privilege to welcome the honourable guests, distinguished keynote & invited speakers, and all the participants.

With the main theme of "Cutting-Edge Innovations on Sustainable Development Goals (SDGs)", the 4th International Conference on Sustainable Innovation (ICoSI) 2020 serves as a forum to facilitate scholars, policy makers, practitioners, and other interested parties at all levels from Indonesia and abroad to present their novel ideas, promote cutting-edge research, and to expand collaboration network. The conference has about 1373 participants participating from more than 8 countries 4 continents all over the world, making this conference a truly international conference in spirit.

This multidisciplinary conference was first held in 2012 and has undertaken various changes and adopted to the current technological trends of our education system. From having this conference with just 175 participants back in 2012 we have come a long way in making the conference a huge success with more than 1373 participants participating in this two-day conference.

Formerly, this conference consisted of only 9 (nine) focal conferences. This year, there are 14 focal conferences from various disciplines, namely: 1) The 2nd International Conference on Pharmaceutical Updates (ICPU), 2) The 6th International Conference on Management Sciences

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(ICoMS), 3) The 9th International Conference on Law and Society (ICLAS), 4) The 4th International Conference Medical and Health Sciences (ICMHS), 5) The 6th International Conference for Accounting and Finance (ICAF), 6) The 2nd International Language and Education Conference (ILEC), 7) The 2nd International Conference on Nursing (ICONURS), 8) The International Conference on Information Technology, Advanced Mechanical and Electrical Engineering (ICITAMEE), 9) The 2nd International Conference of Agribusiness and Rural Development (IConARD), 10) The 10th International Conference on Public Organization (ICONPO), 11) The 2nd International Symposium on Social Humanities Education and Religious Sciences (ISHERSS), 12) The 5th Dental Research and Exhibition Meeting (DREAM), 13) The International Conference on Hospital Administration (ICHA), and 14) The 3rd International Conference on Sustainable Agriculture (ICoSA).

Accordingly, We are proud to announce that this year, the 4th ICoSI 2020 breaks the Museum Rekor-Dunia Indonesia (MURI) record as the Virtual Multidisciplinary Conference with the Largest Number of Area of Fields in Indonesia

In addition, this year, this conference holds special value since this is the first conference in the history of our university where the entire conference is taking place remotely on a digital platform through the use of advance technologies due to the Covid-19 Pandemic.

I would take this opportunity to express my highest respect to the Rector of Universitas Muhammadiyah Yogyakarta, Dr. Gunawan Budiyanto who gave approval and ensured the maximal support from all the faculty members of Universitas Muhammadiyah Yogyakarta (UMY) that made this event a big success. In addition, my appreciation goes to all the support teams who have provided their valuable support and advice from planning, designing and executing the program.

Let me conclude my speech by encouraging the delegates to participate with an increasing number in all the activities and discussions through the digital platforms for the next two days. I wish everyone a successful, safe, and fruitful conference.

Thank you!

Wassalamu'alaikum Wr. Wb.

Yogyakarta, Indonesia, 14 October 2020

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Welcoming Remarks by the Rector of Universitas Muhammadiyah Yogyakarta

Assoc. Prof. Dr. Gunawan Budiyanto

Innovation is the beginning of the development of technology, and technology is a development machine that is expected to provide benefits to humans and provide the smallest possible impact on environmental quality. In the concept of sustainable development, development must improve the quality of human life without causing ecological damage and maintain the carrying capacity of natural resources.

International Conference on Sustainable Innovation (ICoSI) is an international conference which is an annual conference held by the University of Muhammadiyah Yogyakarta (UMY), Indonesia. In 2020 this raises the issue of "Cutting-Edge Innovations on Sustainable Development Goals." Therefore, on behalf of all UMY academics, I would like to congratulate you on joining the conference, hoping that during the Covid-19 Pandemic, we can still provide suggestions and frameworks for achieving sustainable development goals.

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About The 4th International Conference on Sustainable Innovation (ICoSI) 2020

Cutting Edge Innovations for Sustainable Development Goals

The 2030 Agenda for Sustainable Development is enacted by the United Nations as a shared blueprint for peace and prosperity for people and the planet, now and into the future. It consists of strategies to improve health and education, reduce inequality, and spur economic growth while also conserving natures by 2030.

This year, however, at the first one-third of its timeline, the SDG Reports shows that the outbreak of COVID-19 did hinder the achievement, or at least decelerate the progress of achieving the 17 goals. In fact, according to the report, "some number of people suffering from food insecurity was on the rise and dramatic levels of inequality persisted in all regions. Change was still not happening at the speed or scale required", accordingly.

Therefore, in this event of pandemic, the quantity and quality of research, innovation, and more importantly multi-disciplinary collaboration are indispensable. Furthermore, there needs to be clear ends of those works. That is how those research are applicable and benefits directly to the society. That is how those research is incorporated as the drivers of policy making, and used practically in the society. Hence, the stakeholders especially the triple helix of higher education institution, government, and industry must be re-comprehended and supported to reach the common goal of the SGD.

International Conference on Sustainable Innovation (ICoSI) has been essentially attempting to strengthen this regard since its first establishment. One of the goals of ICoSI is to provide primarily a platform where scholars, practitioners, and government could grasp the development and trends of research. Hopefully, meeting these actors altogether would result in stronger collaboration, sophisticated and advantageous research, and brighter ideas for further research. Based on these reasoning, this year, the 4th ICoSI 2020 UMY is themed 'Cutting-edge Innovations for Sustainable Development Goals".

Improving from last year conference which brought nine focal conference, this year ICoSI 2020 UMY brings 14 disciplines, from social sciences, natural sciences, and humanities. ICoSI 2020 received as much as 1005 papers. The paper works submitted in ICoSI 2020 UMY will be published in Atlantis Proceedings, IOP Proceedings, National/International Journals, and ICoSI ISBN-indexed Proceedings.

Nevertheless, ICoSI believes that publication is only the beginning of research dissemination. The publications will enhance the chance of the research known by wider audience, and then used, applied, and incorporated at either system, institutional, or personal level of human lives.

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TRACK ECONOMICS, LAW, EDUCATION, SOCIAL, AND HUMANITIES

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The Effect of Passive Physiotherapy on Hemodynamic Status of Patients with Head Injury: A Literature Review

Ni Luh Seri Astuti[1], I Made Moh. Yanuar Saifudin[2,7,*], Novida Prima Wijayanti[3], Marsha Yoke Nancy[4], Ahmad Firdaus[5], Sri Setiyorini[6]

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ABSTRACT

The incident of head trauma has been increasing every year. Success management requires patient to bedrest. Bedrest with head injury could be done by providing intervention with passive range of motion (PROM) and changing position. The risks and benefits of interventions must be carefully evaluated and the best treatment options must be directed. This study aimed to identify whether passive physiotherapy is safe for cerebral hemodynamic status in critical patients with head trauma. The literature reviews were conducted using the PRISMA model. The articles were collected from 5 journal database sources including PubMed, EBSCO, ScienceDirect, Scopus and ProQuest. Searching process was performed by main search terms, including "(Passive Range of Motion OR Passive Exercise OR Physiotherapy) AND (Intracerebral Pressure OR Cerebral Pressure OR Cerebral Hemodynamic)". Quality of each articles were assessed by Critical Appraisal Skills Program (CASP) tools and synthesized to identify common themes. Totally 9 articles were meets inclusion criteria and used. The result of showed that several passive physiotherapy techniques can be applied to head injury patient such as passive ROM, bed cycle and bed-based ambulation. Passive physiotherapy is safe to use with changing cerebral hemodynamic status but has the potential to cause several effects such as slightly increasing heart rate, mean arterial pressure (MAP) and headache. These effects are temporary and will return to normal condition after the end of the training session. Passive physiotherapy is safe to cerebral hemodynamic status including intracranial pressure, cerebral perfusion pressure, and mean arterial pressure, in critical patient with head trauma

Keywords: *Critical patients, head trauma, passive physiotherapy, cerebral hemodynamic*

1. INTRODUCTION

Increased intracranial pressure (ICP) is a neurological emergency that can be caused by a variety of neurological injuries and is closely associated with poor outcome criteria, including cerebral ischemia and even death. Increased intracranial pressure (ICP) has been observed in several procedures, such as endotracheal suction, bronchoscopy or intramuscular injection. In most cases, the increase in ICT is only temporary, but in some patients, a long-term increase in ICT can occur (Roth et al. 2012).

According to a WHO (World Health Organization) report, around 1.2 million people die each year due to head injury cases. Likewise in Indonesia, the incidence of head injuries each year continues to increase along with the increase in vehicle volume, estimated at around 500,000 cases and 100,000 people died from head injuries (Kemenkes RI, 2013).

Rapid diagnosis, careful analysis of the pathophysiology involved, and invasive monitoring and therapy are essential for the successful management of this potentially dangerous condition. To date, there have been few interventions that have demonstrated the efficacy of ICT reduction, but not all have been shown to improve the expected outcome criteria. The risks and benefits of intervention must be carefully evaluated and the best treatment options should be directed to each patient (Amri 2017).

Patients who experience increased intracranial pressure usually present in patients with head injuries and strokes accompanied by decreased consciousness. The impact is hemodynamic instability, especially blood pressure, which can interfere with blood circulation and heart performance, hence hemodynamic management is an important part of treatment. Monitoring is necessary because hemodynamic conditions greatly affect the function of oxygen delivery and involve the function of the heart organs (Hartoyo and Rachmilia 2017).

The supine position given to the patient for a long period of time can reduce blood circulation especially from the lower extremities to the heart should be large. Bed rest on the first three days causes the plasma to be reduced by 8-10% and decreased to 15-20% on the fourth week of bed rest. The decrease in plasma volume causes an increase in the burden on the heart. Hemodynamic disturbances in patients who experience head injuries and decreased consciousness must get a stimulus that comes from outside, namely by providing passive exercises and changes in position (Vollman 2013).

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Prevention of the above conditions in bed rest patients with head injuries can be done by providing interventions in the form of passive ROM (Range of Motion) exercises and position changes. ROM itself aims to maintain or improve the level of perfection in the ability to move joints normally and completely, therefore muscle flexibility can be maintained and joint contractures do not occur. In addition, the cardio function of respiration can also be maintained stable. Some conditions for medical rehabilitation in head injury patients include hemodynamic in a stable condition, no other comorbidities, the patient does not bleed in/after surgery, and is calm/not restless (Nopitasari and Sulistyowati 2017).

According to Damping (2012), the latest data regarding the effects and benefits of passive physical therapy for the health status of severe head injury patients is to improve the quality of care for patients, therefore the researchers interested in discussing more about this topic. This literature review study aims to identify whether passive physiotherapy is safe for cerebral hemodynamic status in critically ill patients with head trauma.

2. METHODS

Literature review study approach has been used in answering the specified objectives. Literature review is a form of research that studies, creates, and synthesizes representative literature on a topic in an integrated manner so as to produce new frameworks and perspectives on the topic (Torraco, 2005). The strategy to search for articles that has been carried out is to determine search terms based on the PICO method (patient, intervention, comparison and outcome). The PICO structure used was Patient: patient with head trauma; Intervention: physical therapy OR range of motion OR passive range of motion OR passive exercise OR physiotherapy; Comparison: -; and Outcome: intracerebral pressure OR subarachnoid pressure OR cerebral perfusion pressure.

Based on the PICO, the search terms were obtained: " physical therapy OR range of motion OR passive range of motion OR passive exercise OR physiotherapy) AND (intracerebral pressure OR subarachnoid pressure OR cerebral perfusion pressure". The researchers conducted a search on the 5 journal databases, namely PubMed, EBSCO, Science Direct, Scopus and ProQuest. The limitation of the search for articles used is that only articles published in English and the availability of full text that can be downloaded. In that case, the researchers also set the criteria for the selected articles. The criteria are as follows:

1) Inclusion criteria: a) respondents were given passive physiotherapy (passive exercise, passive ROM, physical therapy, and the like), b) respondents were in a critical condition due to head trauma, c) monitored 1 or more cerebral hemodynamic status continuously (ICP, CCP, MAP and the like), d) study design is an observational or clinical trial, e) full-text and English-language articles.

2) Exclusion criteria: research by type of letter, abstract, dissertation, thesis and qualitative study.

3. RESULT

Literature searches from the PubMed, EBSCO, Science Direct, Scopus and ProQuest databases with limitation of articles published in peer-reviewed, English and in the last 10 years, obtained as many as 185, then screened based on titles, keywords and abstracts to get 9 articles. From a total of 9 articles, the researchers made a selection based on full text and there is no articles were excluded. 9 articles included in studies synthesis.

Data extraction on the selected articles has been carried out independently by 5 researchers by first conducting a critical analysis using the Critical Appraisal Skills Program (2018), to determine the feasibility of the article content. The researchers also extracts data independently of the sample characteristics, design, intervention, results and other quantitative information implemented in the intervention in the study.

As for the flow of the search process we have carried out, we have put in a flow diagram based on the PRISMA (Preferred reporting items for systematic reviews and meta-analysis) 2009 Flow Diagrams (Liberati et al. 2009).

Table. 1 Articles Data Extraction

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Author	Design	Sample Size	Sample Characteristics	Intervention	Number of Intervention	Key Variables	Result
(Sottile et al. 2015)	Cohort Retrospective	86 respondents	Respondents with subarachnoid hemorrhage (n=42), subdural hematoma (n=17), intracranial hemorrhage (n=19), and trauma (n=8). The average patient age was 60 years, as many as 45 of them were male.	86 patients received physical therapy in a total of 293 sessions in the NICU (n=132) and post-NICU (n=161). ROM = 29% (NICU) and 9% (post-NICU). Bed-based intervention = 77% (NICU) and 74% (post-NICU). Switching = 57% (NICU) and 84% (post-NICU). Standing = 62% (NICU) and 82% (post-NICU). Walking = 32% (NICU) and 65% (post-NICU). Respondents with subarachnoid hemorrhage (n=42), subdural hematoma (n=17), intracranial hemorrhage (n=19), and trauma (n=8). The average patient age was 60 years, as many as 45 of them were male.	Average of 3 sessions per week with a duration of 25 minutes.	Intracranial pressure (ICP).	There were no significant changes in the ICP status of the patients who were given physical therapy. It was concluded that physical therapy intervention in patients with head trauma is safe to conduct in the NICU.
(Yataco et al. 2019)	Cohort Retrospective	153 respondents.	The most common primary diagnoses were subarachnoid hemorrhage (SAH) (61.4%) and intracerebral hemorrhage (17.0%). The mean of patients was 58 years (range, 23–95), and 94 patients (61.4%) were women. The majority of patients who survived and were able to go home were (N =	A total of 117 patients (76.5%; 95% CI, 69.2-82.5%) were mobilized, and the mean time from EVD placement to initial mobilization in these 117 patients was 38 hours (range, 4–537). . The mean time from EVD placement to initial mobilization was 83.0 hours. Whereas 36 patients were not mobilized, the	Within a span of 38 hours, the patient is given the intervention according to the patient's ability.	Progressive mobilization.	Progressive early mobilization in neurosurgical intensive care unit patients with external ventricles drains is a safe and feasible measure.

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			127 [83.0%]) with a length of stay of 17 days (range, 2-106).	most common reason was decreased patient response (23 [63.0%]). Ambulation for 51 patients (43.6%), moving from supine to sitting for 36 patients (30.8%), from bed to chair for 20 patients (17.1%), and from sitting to standing for 10 patients (8.5%).			
(Shahsavari et al. 2020)	Case series: Prospective	90 respondents	Patients with ICH and tumor were seen in 6.6 + 3.1 days and 8.1 + 5.8 days. Patients with SAH had a median Hunt Hess Grade 3 and a modified Fisher grading scale 4. Patients with ICH had a score of 2. Mean age was 56 + 14 years. The mean time between EVD placement and PT session for patients with SAH was 7.7 + 4.5 days.	Walk without any assistance (5.45). Walking with the assistance of a gait and without assistance (2.7%). Walking with the help of 1 person (35.15%). Walk with the help of 2 people (10.3%). Lying on the spot (3.8%). Moving from bed to chair standing (16.8%). Standing (6.5%). Sitting on the edge of the bed (9.8%). Sitting in bed/exercising in bed (2.7%). Moving from bed to chair (3.2%). Passive range of motion in bed (3.8%). Walk without any assistance (5.45). Walking with the assistance of a gait and without assistance (2.7%). Walking with the help of 1 person (35.15%). Walk with the help of 2 people (10.3%). Lying on the spot (3.8%). Moving	Routinely done every day with a duration of 30 minutes.	Ambulation.	Physical therapy is feasible in patients with EVD and can be tolerated safely.

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				from bed to chair standing (16.8%). Standing (6.5%). Sitting on the edge of the bed (9.8%). Sitting in bed / exercising in bed (2.7%). Moving from bed to chair (3.2%). Passive range of motion in bed (3.8%).			
(Roth et al. 2017)	Cohort Prospective	10 respondents.	Respondents with subarachnoid hemorrhage (n=7), traumatic brain injury (n=2) and cerebral edema (n=1). The mean patient age was 49 years (range 23–63 years).	A total of 25 passive range of motion (PROM) were given to 10 patients with an average of 2 treatments per patient. Therapy was given while patients were in the ICU for an average of 5 days.	1 session with a duration of 26 minutes.	Cerebral perfusion pressure (CPP), intracranial pressure (ICP), partial brain oxygenation (ptiO2).	The ICP, CPP, and ptiO2 values did not change significantly when compared with the mean values before, during, and after therapy.
(Roth et al. 2012)	Cohort Prospective	84 respondents	Respondents who received intracranial pressure treatment and received PROM, intubated patients aged 17-84 years, with a total of 84 respondents (42 women and 42 men).	Respondents were divided into two groups and received physiotherapy training, namely group 1 who had an intracerebral pressure (ICP) <15 mmHg and group 2 who had a cerebral pressure (ICP) of C15 mmHg.	exercise once a day with a training duration of approximately 26 minutes.	Cerebral perfusion pressure (CPP), intracranial pressure (ICP) and MAP.	The mean ICP before treatment was 11.5 ± 5.1 mmHg, with a significant reduction of 1 mmHg during therapy (p = 2.0e-10). This was also true for Group 1 (initial ICP 9.4 ± 3.7 mmHg, reduction 0.7 mmHg, p = 3.8e-6) and Group 2 (initial ICP 18.1 ± 2.7 mmHg, reduction 2 mmHg, p = 3.7e-6). However, persistent ICP reduction after therapy was seen only in Group 2. There was no significant difference between mean CPP and MAP comparing ICP

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							before and after PROM in all groups.
(Thelandersson et al. 2016)	Cohort Prospective	20 respondents.	Respondents who experienced head trauma (TBI), experienced cerebral infarction or cerebral hemorrhage requiring ICU treatment and had their intracranial pressure measurements taken from 18 to 49 years old, with 13 male and 7 female.	20 respondents received an exercise intervention using a bedside cycle ergometer after being admitted to the NICU and received approval from a neurologist. Respondents can do the exercises actively or passively without any interference. ICP, CPP, MAP, HR, CO, SV, SVV and Spo2 were measured at: 10 and 5 minutes before exercise. 5, 10 and 20 minutes during training. 5 and 10 minutes after exercise.	exercise for 20 minutes.	Cerebral perfusion pressure (CPP), intracranial pressure (ICP), MAP,HR, CO, SV, SVV and Spo2.	Changes in intracranial pressure and the hemodynamic system occur during exercise. There was a significant increase in MAP ($p = 0.029$) and SV ($p = 0.003$). There was an increase in CO ($p = 0.066$) and CPP ($p = 0.057$).
(Olkowski et al. 2013)	Retrospective analysis.	25 respondents.	The majority of patients in the study were women (76.0%), and the mean age was 55.6 years. One patient (4%) was classified as SAH Hunt and Hess class I, ten patients (40%) were classified as SAH Hunt and Hess class II, eleven patients (44%) were classified as SAH Hunt and Hess class III, and three patients (12%) classified as low-grade SAH (Hunt and Hess class IV/V). Types of aneurysm	25 patients participated in the intervention during the 286 sessions of the early mobilization program: bed mobility training (61.2%, 175 of 286), transfer training (54.9%, 157 of 286), therapeutic exercises (39.2%, 112 of 286), gait training (36.3%, 104 of 286), balance training (36.0%, 103 of 286), and ADL training (17.8%, 51 of 286).	Participation in the initial mobilization program began on a mean of 3.2 days after SAH with a mean duration of 11.4 sessions per patient for 30-60 minutes per session.	Safety and feasibility of patient participation in early mobilization programs.	The results of this retrospective study suggest that early mobilization programs for patients with non-traumatic SAH are safe and feasible.

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			treatment with endovascular coil embolization were 19 patients (76%), surgical clip ligation of 4 patients (16%), and no identifiable aneurysm in 2 patients (8%).				
(Brimioulle et al. 1997)	Quasy experiment	*65 respondents.*	*In this study, there were 39 male patients and 26 female patients, and the mean age was 48 years. Respondents were grouped based on the level of awareness in which respondents with a good level of awareness exercise, therapy intervention would be carried out (n= 23), while for patients with decreased awareness, PROM (n= 42) would be performed. From each intervention, it was subdivided based on the level of ICP, in the exercise therapy intervention there were 15 patients with normal ICP and 8 patients with high ICP, while in the PROM intervention there were 30 patients with normal ICP and*	*There are two intervention groups in the study. The first group performed body positioning and the second group received exercise therapy. For exercise therapy, it is divided based on the patient's level of consciousness, namely fully conscious and unconscious which is assessed based on the GCS score. At a good level of awareness, exercise was carried out while for patients with decreased consciousness, PROM was performed.*	The research was conducted during the day, during regular physical training sessions or additional sessions at the end of the afternoon session.	Body positions and exercise therapy.	*Body position, studied only in patients with normal ICP, and did not affect heart rate. At rest, changing from a 30 degree head-up position to a supine position decreases SAP (P <.05). At rest, compared to a 30 degree head-up position, the supine position increased ICP (P <.01) and increased CPP (P <.05). After rest, briefly continued with the head position at an altitude of 30 to 45 degrees and found that it did not affect ICP but decreased CPP (P <0.001).* *PROM* *Passive range of motion (PROM) increases heart rate slightly and does not affect SAP. In patients with normal ICP, an interaction was observed between the effects of position and movement (P <.01). The movement did not affect the ICP or CPP at the 30 and 45 degrees head-*

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			12 patients with high ICP.				*up, but the ICP decreased (P <.05) and there was an increase in CPP (P <.05) in the supine position. In patients with high ICP, PROM decreased ICP (P <.01) and increased CPP (P <0.02). In four patients with normal ICP and in four patients with high ICP, PROM was associated with suppression of abnormal ICP waves (recorded on ICP tracing) and increased consciousness (reported by physical therapists). Both changes usually disappear immediately after cessation of limb movement.* *Exercises* In patients with normal ICP, exercise increased heart rate (P <0.001), slightly increased SAP and CPP (P <.05) during lower limb movement, and did not affect ICP. In patients with high ICP, exercise therapy increased heart rate (P <.001), did not affect SAP and CPP, and decreased ICP (P <.05) during upper limb movement. The isometric contraction of the adductor had different effects in

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							the two groups. In patients with normal ICP, heart rate, SAP, ICP, and CPP increased when compared with rest (P <.001) or with exercise (P <.001). The intracranial pressure increased above 30 mm Hg in some patients, and headache occurred in 8 of 15 patients. This effect is temporary, and the variables usually return to baseline within 1 minute of the end of a training session.
(Koch et al. 1996)	Cohort Prospective	*12 respondents.*	Respondents with SAH 5 patients. Respondents with SDH 2 patients. Respondents with other causes of cerebral bleed were 7 patients. Age range 19-73 years. Male gender, 7 patients. Female gender, 5 patients.	Total of 20 passive ROMs: - 6 patients on a mechanical ventilator received 10 passive ROM sessions. The other 6 patients breathed spontaneously. Every 7-8 minute session, outcome measures were taken at baseline and every minute interval during the session.	Passive ROM.	MAP (mean arterial pressure), ICP (intracranial pressure), HR (heart rate)., RR (respiratory rate), and GCS (Glasgow Coma Scale)	The result of passive ROM showed no significant change in the ICP or CPP values. Thus, Passive ROM is safe to administer to patients with neurosurgical stability (no intracranial hypertension).

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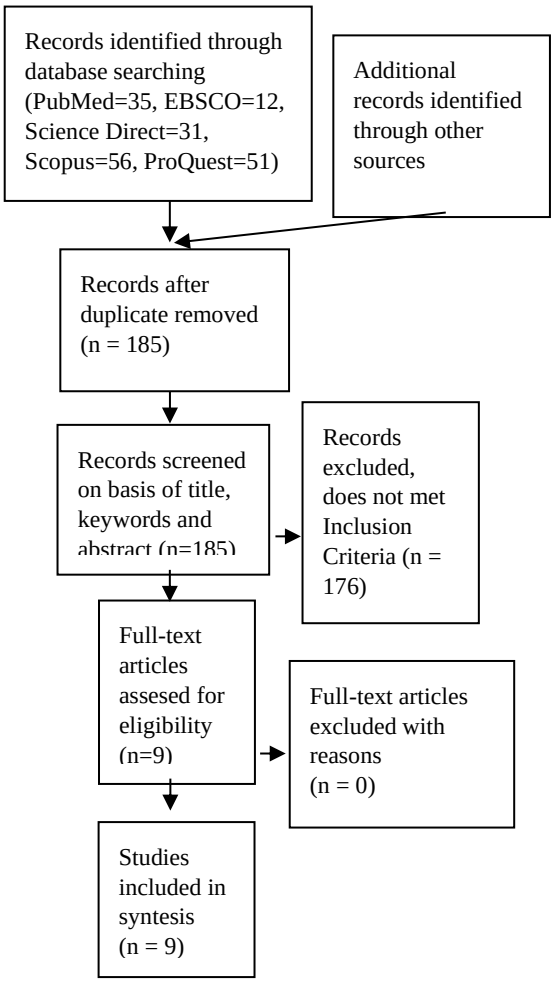
REVIEW LITERATURE FLOWCHART BASED ON PRISMA GUIDELINES



The data were extracted using a predefined format. The key information extracted included the objectives, objectives, methodology, and key findings of the 9 articles included in the study. The data from the articles were analysed to get a theme. The credibility of the analysis was enhanced by reviewing and having discussions relating to emerging analyses and interpretations with the researcher members.

3.1. Study Characteristics

There were 1 quasi experimental article and 8 study articles with a cohort design, of which 3 were retrospective articles and 5 were prospective articles. All articles have been published in peer-reviewed journals in the period 1996-2019. The sample size for the entire article ranged from 10-153 respondents. The characteristics of the respondents in the whole article experienced head injuries and received intensive care.

3 different types of interventions have been reported, namely PROM (Sottile et al. 2015; Yataco et al. 2019; Shahsavari et al. 2020; Roth et al. 2017; Roth et al. 2012; Brimioulle et al. 1997; Koch et al. 1996), Bed-based ambulation (Sottile et al. 2015; Olkowski et al. 2013; Yataco et al. 2019) and Bedside cycle (Thelandersson et al. 2016).

4. DISCUSSION

There are various interventions for passive physiotherapy in intensive care patients. Studies show that the Passive Range of Motion (PROM) has strong evidence regarding the level of safety and feasibility. This type of physiotherapy is considered standard therapy in the intensive care unit (ICU), and patients are treated regularly through active or passive range of motion exercises (Roth et al. 2017).

Changing the head position and exercise in bed affect the hemodynamic of the patient but affect other things such as preventing contractures, increasing patient participation in functional activities, reducing complications associated with critical illness in certain patient populations. From existing research, it is stated that physiotherapy activities such as PROM activities, other physical exercises are safe for use in head injury patients (Koch et al. 1996).

The results of the study indicated that the physiotherapy in a patient with head injury affected the patient's hemodynamic and was safe to do so, as well as affecting the patient's length of stay. In this case, physiotherapy is a form of health service aimed at individuals and/or groups to develop, maintain and restore movement and body functions throughout the life span using manual handling, increased movement, equipment (physical, electro-therapeutic and mechanical) functional training, and communication (Moeloek, 2015).

In this study, physiotherapy was conducted to assess the safety and feasibility of early mobilization. Patients can experience minimal side effects, which are associated with normal physiological changes associated with activity (Olkowski et al. 2013). In addition, physiotherapy performed on patients with head injuries results in a decrease in ventilator use and a significant change in length of stay in (Roth et al. 2012).

Physiotherapy in patients with head injuries can improve hemodynamic processes as well as blood circulation which is influenced by body position through movements performed during physiotherapy movements such as walking with assistance, moving from bed to wheelchair, standing, sitting on the edge of the bed, moving from bed to chair. The circulation process is influenced by changes in body gravity hence perfusion, diffusion, distribution of blood flow, and oxygen can flow throughout the body, and therefore oxygen saturation increases (Nopitasari and Sulistyowati 2017).

In several studies reported that hemodynamic changes can occur as in a study where physiotherapy was performed on 84 patients and 289 treatment units, which showed that physiotherapy had an effect on ICP and CPP. Patients who are sick and undergoing treatment in the ICU are given regular physiotherapy exercises. The reduction in ICP occurred significantly after monitoring in patients with 53.4% (n = 159) during physiotherapy, 22.1% (n = 66) showing no change, and an increase of 24.5% (n = 73) in patients during physiotherapy. However, physiotherapy has no effect on changes in blood pressure during physiotherapy. This is in line with Koch et al. (1996), research which shows that physiotherapy can be safely administered to critical patients in neurosurgical cases. This shows that physiotherapy is one of the pillars in the treatment of motor

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deficits (Roth et al. 2012).

5. CONCLUSION

This review of the study provides knowledge in various ways in conducting community-based disaster preparedness training. This study highlights the effective implementation of providing information on disaster mitigation and preparedness based on empirical research that can be adapted to the community. Apart from that, this review also discusses the effective results. This may be useful for disaster management policy makers to develop the effectiveness of modified information delivery and training for communities at risk of being affected by disasters.

The findings indicate that passive physiotherapy is indispensable in critical patients, especially in patients with head injuries. These results can provide guidelines for nurses to arrange interventions and implement physiotherapy in critical patients with head trauma as an important action to be taken as early as possible to maintain the patient's hemodynamic. Stable hemodynamic will speed up the recovery process for patients, therefore treatment time in the hospital can be shortened and can reduce hospital costs compared to patients who have a long recovery time.

Many of the studies included in this review were cohort studies. While this review reflects the effects of physical therapy (passive exercise, passive ROM, physiotherapy, and the like) and it may influence the generalizability of the findings. The decision was made to undertake an inclusive review, which included length of stay and hemodynamic status. There are various challenges in synthesizing findings from a different range of studies. The researchers presented a robust and transparent approach to this review and consistent messages emerged around this aspect of the care relationship, adding to the credibility and generalizability of the findings.

Passive physiotherapy is safe for cerebral hemodynamic status (ICP, CPP, and MAP) in critically ill patients with head trauma and it is a recommendation that this action is highly recommended to accelerate the patient's healing process.

AUTHORS' CONTRIBUTIONS

AF, MYN, NPW and SS made equal contributions to this work and were co-authors of the correspondence. SA and MMYS have full responsibility for completed articles, have access to data, and control the decision to publish. SA is the first author at the same time to have a literature theme. AF, MYN, NPW, and SS contributed to the literature search and undertake a critical review. SA and MMYS conducted critical studies, journal searches as well as article synthesis. All compiled literature critically. SA and MMYS revised the manuscript. All authors read and approved the final manuscript.

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