

# Strengthening Research Capacity and Disseminating New Findings in Nursing and Public Health

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## Preface

The proceedings of the 1st Andalas International Nursing Conference (AINiC) 2017 is a compilation of the papers presented at the conference held in Padang, West Sumatra, Indonesia, 25–27 September 2017. The conference has brought together a variety of professionals and researchers in the field of nursing science and education; e.g. nursing experts, nursing researchers, healthcare professionals, nursing educators, and students. This book contains keynote speeches, plenary sessions and research presentations.

We expect the proceedings will contribute to research and development in learning, the disseminating of new findings in nursing and to stimulate networking within nursing practice, nursing research and nursing education.

AINiC 2017 Committee

## Conference objectives

- Accommodate and increase research contributions in the field of nursing and health
- Facilitate research publication
- Improve the understanding and mastery of nursing and health
- Initiate the possibility of establishing cooperation amongst individuals and institutions

## Conference program

MONDAY 25 SEPTEMBER 2017

Opening Ceremony and Welcome Speech

*Cultural tribute and art*

Tari Galombang (Traditional Dances)

Video Playing

Indonesia Raya National Anthem

Holy Quran

### WELCOME SPEECHES

AINiC Committee President Welcome Speech

Faculty of Nursing Dean Speech

University of Andalas Rector Speech

Governor of West Sumatra Welcome Speech

Directorat General Dikti Speech

Traditional Dance (Piring Dance)

Session praying

## Foreword

Nursing practice and research have been continuously developed to meet new challenges. Research and practice development are important to initiate new strategies to provide alternatives and to face the needs of related elements in educating nurses better for the future.

The present proceedings comprise the selection of contributed papers of the 1st Andalas International Nursing Conference (AINiC 2017) in September 2017 by the University of Andalas. The Conference provided an opportunity to present newly developed and/or applied practice approaches and new strategies in nursing practice and service development. It was also an important meeting place for researchers and educators providing opportunities to meet each other and establishing new network facilities.

The seminar was structured in plenary sessions, oral sessions and poster sessions. Papers presented covered a wide range of topics, regional and national issues. We wish to thank all participants, and presenters in particular, for their efforts and contributions to the success of the seminar. We thankfully acknowledge the valuable comments of the reviewers to these seminar proceedings.

Editors

## Plenary speech

### **Distinguished speakers and participants**

It is my great pleasure to be here today to address this first Andalas International Nursing Conference (AINiC 2017).

We are very grateful to welcome you all in Padang City. We hope you all enjoy the city as you enjoy the conference.

Welcome to the motherland of victorious Minangkabau.

We are fully fortunate to have the support from all of the important institutions: the city government, university, invited speakers and sponsors.

I would like to refer much gratitude and a warm welcome to the Directorate General Higher Education of Indonesia, our fully respected Governor West Sumatra, and our University of Andalas Rector.

Please allow me to send an appreciation to all members of the organizing committee who have put together and carried out the program.

Research has clearly brought into focus the need for literature development and to guide clinical practice decisions. Engaging in research is a way to influence practice and policy, to learn about research itself, to learn about oneself, and to change the way we think. Being actively involved in research will provide opportunities to gain a more in-depth understanding of knowledge and a renewed perspective.

In recent years, health research publications have been highlighted as important to science knowledge development and its strong relationship to clinical practice and social development elements. In nursing itself, we know the term Evidence Based Nursing Practice (EBNP) which means nursing professionals employ the results of research in their daily intervention nursing care.

Publication is important as a key way for professionals and researchers to validate their work, and in the wider scheme of matters, to create novel solutions to complex problems through dialogue with fellow researchers. Publishing research is important because we all benefit from cooperation. Publication is the way that scientists communicate their findings with others. And the larger the cooperating group, the better. Publication lets the collaborating group expand to include the whole world and people who will enter our field in the future.

Publishing research will boost scientists' recognition, generate invitations to meetings, present consulting and collaboration opportunities, and increases citation rates because their productivity will be more visible. Making research to be published maximizes the potential return on the investment in research, and those researches can be repatriated to the countries from which they may have been collected by foreign scientists.

Research publishing will give people the opportunity to read our research results, they may build on our work, repeating, correcting, extending it to new cases, applying methods, results and the conclusions in ways we never thought of. In exchange, other publications may benefit us as well.

The primary motivations for us as scientists to publish are to demonstrate our contribution to science, and the consequent peer-recognition that influences one's reputation and employment opportunities, promotion at work, and ability to win further research funding.

Personal satisfaction in completing a study and enthusiasm about communicating findings and opinions to society. How does it make you satisfied! You all know the feeling.

One of the key elements of our meeting today is to minimize the gap between research and research publication willingness in order to increase research participation and research implementation.

It is such a great opportunity we gather here together to boost research impact.

Welcome and Enjoy yourself in Padang!

#### DR. MOHAMMAD DIMYATI

Research and Development Directorate General Ministry of Research, Technology and Higher Education

“Health Research Trend and Focus: How to Win International and National Research Funding and Grants”

The research funding comes from several resources. It is also common knowledge that funding is granted based on a competitive criteria. Research financial funding matters in every sector, including medical and health science. Research funding will provide the right circumstances to ensure the sustainability of research continuation and impact. There are rigorous requirements to win research grants.

Among the highlighted topics in the general plenary session:

- International grants opportunities
- National grants opportunities
- Tips to win and proposal preparation

#### PROF. DR. RIZANDA MACHMUD, MD, FISPH, FISCN

“Mental Health Focus is Now Global Public Health Challenges”

The Movement for Global Mental Health is a network of individuals and organizations that aim to improve services for people living with mental health problems and psychosocial disabilities worldwide, especially in low- and middle-income countries where effective services are often scarce. Two principles are fundamental to the Movement: scientific evidence and human rights.

Among the highlighted topics in the public health plenary session:

- Global perspective of mental health into public health responsibilities
- Cultural and contextual challenges of mental health concerns in public health
- Policy development in mental health as public health focus

#### PROF. LISA McKENNA, PHD, RN RM FACN

“Preparing Qualified Nurses: Nursing Education Institution Major Role in Providing Excellence Standard of Nursing Education, Graduate Transition and Work Readiness.”

Nursing education in Indonesia is currently facing challenges related to the application of nursing knowledge in clinical environments and inability of students in application of nursing procedures in clinical settings. Nursing education institutions need to pay careful attention to educational performance and clinical skills, as well as to determination of standards and validation of education quality.

Nursing education shall fulfill the competency demanded. This shift process should make a combination of serious hard work of the educational institutions and practical field institutions to provide supports to meet the achievement of expected competencies.

Among the highlights topic in nursing education plenary session:

- Nursing education global standard
- Nursing education institution strategy to enhance quality
- Graduate transition to work readiness: shorten waiting and wasting latent time

PROF. DR. KHATIJAH BINTI ABDULLAH LIM GEOK KHIM

“Theoretical development of Nursing “Where are we now”; A Recent Update of Theoretical Foundation in Nursing.”

The development of knowledge for nursing poses an exciting, scholarly adventure for the profession’s scientists. A series of challenges are involved: the challenge to develop the substantive content needed for practice within nursing’s disciplinary perspective, the challenge to sustain excellence in the developing science base and in the preparation of nurse researchers, and the challenge of disseminating stable, appropriate research results to the profession’s clinicians and to the public.

Nursing is entering a new era, moving from the stage of establishing structures to support nursing research and building the cadre of scientists needed to conduct investigations, to the stage of focusing on the identification and study of the phenomena which comprise the body of knowledge needed for practice. A number of directions or priorities for nursing research are evident for the future. Research based practice requires a merger of the talents and expertise of those providing practice and those developing the knowledge base for the profession.

Among the highlights topic in nursing science plenary session:

- Brief explanation of the progress of theoretical past-present in nursing
- Theoretical focus on development in nursing
- Nursing theoretical update and trend; new model and theory in nursing

NS. YUFITRIANA AMIR, S.KEP, MSC, PHD., FISQUA

“Repealing Health Care Inequality to Achieve Health Care Quality Improvements: Technical and Policy Advice.”

AINiC 2017 will be the place for nursing professionals and public health implementation. Health inequality on the other hand designates differences, variations and disparities in health achievements of individuals and groups. Health equality does not imply moral judgement. The crux of the distinction between equality and equity is that the identification of health inequities entails normative judgement premised upon one’s concept of justice, society and reasoning underlying the genesis of health inequalities.

Inequalities in health between population groups exist in all countries. These differences occur along several axes of social stratification including socioeconomic, political, ethnic, cultural and gender. The causes of inequalities in developed may be different from those in developing countries. However, in developing countries improved health among the urban population has been found to be due to access to improved health care knowledge and services.

Among the highlights topic in healthcare service plenary session:

- Healthcare inequality addressing socioeconomic and racial disparities
- Healthcare financing impact inequality
- Policy development in improving healthcare quality

HEMA MALINI, SKP., MN., PHD

“Challenges and Strategies in Conducting Culturally Relevant Health Education Program in Indonesia”

Providing health education to people with chronic disease such as diabetes becomes an important aspect in order to improve the quality of life. However, the structured education program is rarely implemented since there is limited information about how the education program should be conducted. The aim of this paper is to discuss several aspects that has been identified during the implementation and evaluation of a proposed structured education program named InGDEP in Indonesian setting. Several aspects of health beliefs and values of people with chronic diseases, such as the beliefs of traditional medicine and religious aspects, have been identified. The perception of health professionals concerning the implementation of structured education program is also analyzed. During the program implementation, there were some challenges and strategies that have been applied and proven to be effective during the program. It is recommended that the structured education program should become one alternative in delivering health information to people with chronic disease in Indonesia.

## Plenary speech

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## Challenges and strategies in conducting a health education programme for chronic disease in Indonesia

H. Malini

*Faculty of Nursing, University of Andalas, West Sumatra, Indonesia*

**ABSTRACT:** Providing health education to people with chronic disease such as diabetes becomes an important aspect in order to improve their quality of life. However, a structured education programme is rarely implemented because there is limited information about how such education programmes should be conducted. The aim of this paper is to discuss several aspects that have been identified during the implementation and evaluation of a proposed structured education programme (the Indonesian Group-based Diabetes Education Programme or InGDEP) in an Indonesian setting. Several aspects of the health beliefs and values of people with chronic diseases have been identified, such as those relating to traditional medicine and religious aspects. The perception of health professionals regarding the implementation of the structured education programme is also analysed. During the programme implementation, there were some challenges and strategies that have been applied and proven to be effective. It is recommended that a structured education programme should become one alternative in delivering health information to people with chronic disease in Indonesia.

### 1 INTRODUCTION

Health education is considered as an instrument of health promotion programmes that are intended to improve the health of populations and promote health (WHO, 2017). A health education programme is an activity that seeks to inform individuals of the nature and causes of illnesses such as chronic diseases. Health education is described as having several functions and actions, designed to convey health-related information, attain health-related learning, and lead to skills development and lifestyle modification (Whitehead, 2004).

A health education programme can be conducted and performed at any level and in any situation, that is, from healthy people to people with certain diseases (Glanz et al., 2008). For people with identified diseases or who have a high risk of disease, the health information is designed to help them make lifestyle choices that will lower their health risk and assist them to manage their lifestyle and disease (Glanz et al., 2008).

One of the proposed methods for delivering health education is a structured education programme. A structured health education programme can improve people's knowledge and skills and have an impact on their quality of life (Funnel et al., 2011). A structured education programme has been introduced to health professionals in *Puskesmas* (community health centres) in Indonesia with a proposed programme called the Indonesian Group-based Diabetes Education Programme (InGDEP) (Malini et al., 2017). This programme focuses on conducting regular health education sessions for a month. It is delivered by a team of health professionals and designed to suit the Indonesian cultural background and resources (Malini et al., 2017). The aim of this paper is to discuss some of the cultural beliefs, the perceptions of health professionals, and the challenges affecting the implementation of the structured education programme, as well as the strategies used to overcome obstacles within the programme.

## 2 CULTURAL BELIEFS AND VALUES OF PEOPLE WITH DIABETES

Diagnosis of diabetes disrupts the life of a person and their family. They must accept this chronic disease, learn how to adapt to the condition, and find out some necessary information in order to successfully live with it (Weinger & Leighton, 2009). How a person responds to the diagnosis depends on that person's experience, perception of diabetes, and their peer or family support, as well as the support from healthcare providers.

In terms of diabetes management, there are several cultural beliefs and values that most people with diabetes and their families hold. As in most Asian traditions, Indonesian people consider the family as an important part of their life. Individual success is most valuable in light of the honour it brings to the family. Likewise, a sickness or health condition of one family member will impact on others (Doyle et al., 2010). As in most cultures, religions provide a rich context for health beliefs and practices among Asians. Indonesians believe that illnesses are part of the destiny that the Creator (Allah) decides for them: when Allah creates some diseases, Allah also creates the cure at the same time (Wiryomartono, 2014). Traditional medicines and spiritual healings are preserved throughout the Indonesian archipelago and believed to be a part of the cure. Herbal medicines and tonics called *jamu* are both home-blended and mass-produced.

Some misperceptions regarding diabetes and its management prevail in the Indonesian community. Patients commonly assume that diabetes is caused by too much consumption of raw sugar. In their perception, when someone is diagnosed with diabetes, it is because that person consumes too much sugar. Thus, if they stop consuming sugar, the disease will be cured. Moreover, some patients think that if a diabetic has a family history of diabetes, it is natural for that person to also experience diabetes. Some people in the community also believe that diabetes can be cured after taking medication several times. A number of commercial products advertised on television, in newspapers or in pamphlets, which claim to cure diabetes, encourage such misperceptions (Candra, 2013). These misperceptions exist in the community, contributing to the increasing prevalence of diabetes, and affecting the quality of life of people with diabetes.

## 3 PERCEPTIONS OF HEALTH PROFESSIONALS TOWARDS THE STRUCTURED EDUCATION PROGRAMME

The health professionals involved in this programme have basic competence in conducting health education and they have already frequently provided educational services as educators, even though these services are not part of such a structured programme. Some factors become a consideration in the delivery process of InGDEP. After considering the workload of the health professionals, the number of patients with diabetes, and the resources and facilities of *Puskesmas*, the InGDEP is applied in the form of group-based education. To anticipate such inhibiting factors as literacy skills, language barriers, hearing impairment, and cultural barriers, all materials in the education programme were provided in audiovisual and printed forms (e.g. food pyramid model kit, booklet and leaflet, video recordings). In implementing InGDEP, the health professional team members (consisting of multidisciplinary professionals such as doctors, nurses, dieticians, and health promoters) work together with the patients and family members to enhance their knowledge and skill for diabetes self-management.

There are some perceptions that are identified from the health professionals concerning the programme. *Health professionals believed that health education is to help individuals to cope with their health condition.* The health professionals agreed that it is always possible for them to conduct a health education programme in *Puskesmas*, with the limitations and resources they have, if they can manage it well.

*Health professionals also identified that conducting the programme needs commitment and team work.* Thus, they agreed that group-based activity is the best way to conduct health education in *Puskesmas*. They also stated that support is deemed necessary from the decision makers, such as the head of *Puskesmas* and Ministry of Health officials. *Several benefits of*

*conducting InGDEP* were identified, such as improving the knowledge and motivation of the patients, gaining new experience, and upgrading knowledge and skills in delivering health education programmes. The health education team agreed that they gained new experience, knowledge, and skills when delivering health education programmes.

#### 4 CHALLENGES AND STRATEGIES IN IMPLEMENTING THE EDUCATION PROGRAMME

Some strategies needed to be implemented in order to reduce the chance of rejection of the programme. One positive point of InGDEP as a proposed educational programme is that it does not create a new programme for health professionals. The InGDEP initiative makes use of all elements that have already existed in *Puskesmas*. Basically, the implementation of the programme provides a new perspective for health professionals that educational programmes should be performed in a better way in order to have an impact on patients. Some strategies that were implemented include maintaining communication, assigning the key persons, introducing InGDEP, identifying the potential support system, and collaborating with health professionals.

The first strategy was *maintaining communications*. For this strategy, communication with the person in charge was intensively developed. The involvement of the person who is in charge of the education and the department training and is responsible for introducing new programmes from the District Health Office (DHO) to *Puskesmas* becomes the major support of the programme implementation. The second strategy was *assigning the key person* who will introduce the programme to other staff members of *Puskesmas*. Knowing the background of the team members of the educational programme was also important in understanding their point of view on certain issues. The next strategy was *identifying the potential support system* by visiting other health centres or private hospitals that conducted diabetes education programmes. The reason was to find community support for this programme's future sustainability. Identifying the potential support available for health professionals in the future is necessary if they are to maintain the educational programme. The last strategy was *collaborating with the health professionals*. In recruiting and inviting patients to get involved in this study, some strategies were implemented. The information was distributed through flyers to patients who attended *Puskesmas*. Team members with a background in health promotion also distributed the flyers and informed community members during community visits. The information in the flyers also attracted patients. The free blood check attracted patients because the test is quite expensive. To encourage the patients to complete all the education sessions, friendly reminders in the form of text messages were sent to patients a day before the session by the contact person in *Puskesmas*. In the morning, another friendly reminder was sent. This strategy was effective for most people with diabetes who did not attend the sub-district *Puskesmas* and was evidently effective in maintaining the attendance rate of the patients.

Some obvious challenges while implementing the programme concerned ways to maintain motivation. The health professionals admitted that their involvement in this project increased their motivation to do better in their job. However, maintaining their motivation over a long period to conduct the programme required some rewards and managerial support. To have financial support, the programme needs to be acknowledged by the DHO. The health professionals also mentioned that potential challenges that InGDEP would face in future would be staff member turnover and lack of resources. Staff turnover would become an issue for the team members in terms of their capability. As new staff come in, they will have different capabilities as they have not participated in the education training. Another challenge is the lack of resources, especially in terms of resources to follow up a patient's condition. Although most patients attend *Puskesmas* regularly, following up their condition would be difficult because online medical records are not available, and patients may move without any notice to other *Puskesmas*. In most cases, the health professionals would lose contact with the patients because they cannot be contacted at fixed telephone numbers or addresses.

The patients also revealed some concerns around self-management. For some participants who lived with their family members such as their children, providing the food intake suitable

for them was not easy, because the participants depend on their children to prepare meals. This indicates that family member involvement in this programme needs to be enhanced, not only in accompanying the participants to *Puskesmas*, but also for preparing and measuring the food intake.

Another aspect that they felt became a barrier was in maintaining motivation and the need for support from health professionals, peers, or family to consistently perform self-care activities. Support would rarely be available if the health professionals were too busy, or peer or group meetings were not available after the participants had finished the programme. In other words, the establishment of the education programme needs to be followed up by creating some post-programme support for people with diabetes who have finished the education sessions, in order to maintain their motivation and overcome their difficulties in coping with diabetes on a daily basis.

## 5 CONCLUSION

The implementation and evaluation of an InGDEP as a structured diabetes education programme in Indonesian settings has revealed such important aspects as perception, beliefs, and values, both from the health professionals and the patients. The challenges and strategies from this programme also enrich the explanation of how the programme has been conducted. All of the aspects could become valuable information in order to improve the programme and also to anticipate several obstacles hindering the sustainability of the education programme. Improving the knowledge of people with diabetes to promote self-management behaviour can increase their quality of life. For health professionals, the InGDEP implementation provides them with valuable experience in delivering health education programmes in a structured way.

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## Nursing students' coping mechanisms against bullying during nursing professional practice

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**ABSTRACT:** Coping mechanisms determine a person's response to a stressor, either short-term or long-term stressors. Nursing students often experience some stressors while doing their clinical practice, such as lack of knowledge and clinical experience, and have problems managing good relationships with clinical counsellors or those who are in contact with the students during clinical practice. This study is intended to determine the correlation between bullying and nursing students' coping mechanisms. This is a correlational analytic research with a cross sectional approach. The results showed that there was a correlation between bullying and the coping mechanism in nursing practice ( $p = 0.000$ ). It was expected that the students were able to make efforts to prevent the bullying incident by improving their knowledge and skills while practising as well as improving their socialisation and effective communication skills in dealing with others.

### 1 INTRODUCTION

Nursing education is one division of health education whose orientation is to arrange an effort to improve the quality of the professional nurse through education (Nursalam & Ferry, 2008). While undergoing the educational process, nursing students acquire knowledge and skills through theoretical and practical learning activities. Clinical practice is the most essential element in nursing education. However, when performing nursing practice, students cannot be sheltered from various problems or stressors.

Some stressors that students often experience when performing clinical practice include lack of knowledge and clinical experience, concern at making mistakes, lack of self-esteem, unfamiliarity with the clinical environment, and, most importantly, obstacles in maintaining good relationships with clinical counsellors or people who are in contact with the students while completing clinical practice. One aspect of these practice-related problems is the occurrence of negative behaviours such as bullying (Khater, Laila Zaheya & Insaf Shaban, 2014; Rahman, 2014).

According to Strauss (2012), bullying is a negative behaviour that is carried out by one or more people repeatedly over time, which is aimed at a person who has difficulties in defending him/herself and is characterised by an imbalance of power. In nursing education, bullying is defined as repetitive behaviour which occurs in health and education facilities and is performed by one or more persons against others in order to intimidate, humiliate, and offend the victims (Smith et al., 2015).

Bullying in the nursing student context can fall under several forms of action. In general, bullying is classified into three types; verbal, physical, and psychological (Sejiwa, 2008; Werner, 2012; Chakrawati, 2015). Studies about bullying of nursing students have been undertaken in several countries. Research conducted by Rahman (2014) at Damanhour University in Egypt discovered that 88% of 772 nursing students had experienced bullying behaviour. This data is also supported by research by Clarke et al. (2012) where 88.72% of 674 nursing students in Canada encountered a bullying action.

Bullying that is experienced by the students will result in numerous negative consequences. It produces not only physical but also psychological effects on the student's performance in the form of insomnia, fatigue, declining physical health, anger, uneasiness, anxiety, stress, hatred, helplessness, lack of trust, the urge to leave work or the profession, concentration dissipation, motivation waning, and social relation disorder (Seibel, 2013; Rahman, 2014).

The response to bullying will involve a variety of coping mechanisms. Research conducted by Cooper et al. (2011) discovered that, from 1,133 students in 20 nursing schools in the southern states of the United States, around 73.4% used a coping mechanism with passive behaviour, 43.5% used active behaviour, and 18.1% indicated aggressive behaviour.

A coping mechanism is any effort that is directed to the management of stress, including the effort to solve urgent problems and the defence mechanisms to protect oneself (Muhith, 2015). Coping mechanisms are established through learning and reminiscing processes. Learning means the ability to adapt oneself (adaptation) toward the influence of internal and external factors (Nursalam & Ninuk, 2011).

The use of coping mechanisms depends on how individuals deal with problems. There are two types of coping mechanisms which are commonly used by individuals. The first one is called an adaptive coping mechanism, which is defined as the coping mechanism which supports the function of integration, growth, learning, and achieving the goals. The second one is called a maladaptive coping mechanism, which constitutes the coping mechanism that restrains the function of integration, breaks growth, decreases autonomy, and tends to dominate the environment (Stuart, 2013).

Clarke (2009) argues that nursing students tend to use the adaptive coping mechanism in confronting the stressor or problem. However, another study found that such an adaptive coping mechanism previously applied will be transformed into a maladaptive coping mechanism when the student experiences an acute bullying situation (Clarke, 2009). Therefore, the coping mechanism is considered to be very important. Failure in developing the adaptive coping that responds to any presence of stressors often has an impact on students' health, welfare, and academic achievement (Deasy et al., 2014).

In this regard, this research is intended to identify the correlation between bullying and coping mechanisms during nursing students' clinical practices.

## 2 METHOD

### 2.1 *Study design*

This study uses a correlation analytic design with the cross-sectional approach. The correlation between bullying and the coping mechanisms of nursing practice students is analysed.

### 2.2 *Sample and sampling technique*

The sample selection method used in this research is non-probability purposive sampling. There were 138 nursing students at Andalas University who met the criteria for becoming respondents.

### 2.3 *Data collection and analysis*

The data collection tool consisted of a questionnaire containing statements which were directly filled in by the students. These statements elicited the students' demographic data, bullying occurrence during the nursing students' professional practice, and their coping mechanisms.

## 3 RESULTS

The analysis shows that as many as 68.1% of the students perceived low level bullying events, 29.7% experienced moderate bullying, and 2.2% faced severe bullying occurrences.

The majority of students (94.9%) affirmed that the bullies were nurses. In terms of their response to bullying, most students (79.0%) had applied an adaptive coping mechanism. A significant correlation between bullying and the nursing students' coping mechanisms was obtained as a further result.

#### 4 DISCUSSION

Bullying experienced by students can originate from a number of sources. This research found that the dominant bullying case experienced by the students was perpetrated by nurses (94.9%), followed by lecturers (53.6%), patients or their families (48.6%), classmates (37.7%), doctors (22.5%), and clinical counsellors (13.8%). This trend might occur because, during the process of the clinical practice, the students were inclined to associate with nurses and lecturers to obtain more guidance, duties, or work from them so nurses and lecturers became the major bullying sources.

This finding is in parallel with Palaz's (2013) study of nursing students in Turkey, where the nurses and lecturers (70.8% and 29.5% respectively) became the largest sources of bullying experienced by the students. Likewise, another study (Rahman, 2014) reported that nurses and lecturers became the leading bullies for nursing students at the university because the nursing students dealt with them more often while carrying out nursing practice. Moreover, the nurses regarded the nursing students as junior nurses who were subject to their instruction to execute a variety of tasks such as sending and picking up lab results as well as delivering the patients to the radiology room (Rahman, 2014; Kassem et al., 2015).

The results of the research showed that 92 (97.9%) of 94 students who experienced low level bullying used adaptive coping and two students (2.1%) used a maladaptive coping mechanism. In the meantime, as many as 17 students (38.6%) who experienced moderate or severe bullying utilised an adaptive coping mechanism and 27 students (61.4%) applied maladaptive coping.

The results indicate that there is a correlation between bullying and the coping mechanism used by the nursing practice students of Andalas University in 2016. This output is in line with Clarke (2009) whose research was conducted on nursing students in Canada. Clarke found that the more the students faced bullying, the more they would use a maladaptive coping mechanism such as self-blame, behaviour dismissal, emotional release, and self-diverting.

The study also indicated the tendency of the students who experienced moderate or severe bullying to utilising a maladaptive coping mechanism compared with those who encounter low level bullying. The maladaptive coping mechanism is a coping mechanism that hinders the function of integration, breaks growth, lowers autonomy, and has a tendency to dominate and control the surroundings (Stuart, 2013).

The coping mechanism that was executed by the students who encountered bullying might be varied. The different uses of coping mechanisms could be caused by the students' unequal coping skills. Students who experienced low level bullying were more able to adapt to the bullying problems than those who encountered moderate or severe bullying, who were more liable to use maladaptive coping mechanisms. Furthermore, the coping mechanism that was applied by each individual was not always the same because the individual's coping ability could be affected by several factors, such as physical health, culture, age, conclusiveness or positive consideration, problem-solving skills, social skills, spiritual and social support (Stuart & Laraia, 2005; Viedebeck, 2008).

The maladaptive coping mechanisms often used by the students are in form of avoiding the incoming problems, venting their emotions by saying or doing something bad, refusing to believe in what is going on, blaming themselves for what is happening, and intending to give up to confront that problems. All maladaptive coping mechanisms will not be able to solve the difficulties well. Instead, they will add to the difficulties, conflicts, tension, fear, and anxiety (Kartono, 2011).

Students who have used adaptive coping mechanisms tend to be open about their problems, take active steps, and think about the best way to deal with the problem. They also seek support and advice from others. The adaptive coping mechanism is a coping mechanism

which supports the functions of integration, growth, learning, and achieving goals. When an individual uses adaptive coping, the negative effects that arise from a problem can be lessened (Stuart, 2013; Donoghue et al., 2014). Failure in developing the adaptive coping as the response to any appearing *stressor* often evokes an impact on the students' health, welfare, and academic merit (Deasy et al., 2014).

## 5 CONCLUSIONS

The researchers obtained the following conclusions. The students conducting professional practice who experienced bullying of a low level category were of a higher percentage compared to those who experienced bullying of moderate or high level categories. The students performing clinical practice who used adaptive coping mechanisms were of a higher percentage than those who used maladaptive coping mechanisms. There was a significant correlation between the level of bullying and students' coping mechanisms.

It is expected that students are capable of endeavouring to prevent occurrences of bullying by improving their knowledge and skills during practice along with improving the ability to socialise and communicate effectively in dealing with others. It is suggested that educational institutions create an educational environment that is free from bullying by providing a sense of security and comfort for students so that the process of accomplishing the education goal goes well. Institutions are also recommended to educate students about bullying behaviours and how to deal with bullying issues appropriately. It is expected that nurses and lecturers can review workloads or tasks that are assigned to the students, and it is preferable that the workloads or the tasks should be given at appropriate times. It is hoped that the next researchers will implement further investigations by adding other variables which are related to bullying or by doing further studies on bullying and students' coping mechanisms using a qualitative method so that the results of the research will be more significant and a deeper understanding about the problem of bullying can be acquired

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## A systematic review: Implementation of reflective learning in nursing practice

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**ABSTRACT:** The aim of this study was to identify the use and effectiveness of reflective learning in nursing practice. This study used a systematic review of qualitative studies of reflective learning in nursing practice. Articles were searched for and identified from three databases (ProQuest, Cengage and EBSCO). Eleven studies were selected, with the total participants being 24 Register Nursing students, 315 nursing students, and 11 tutors in nursing. The methods used in these studies were interviews, reflective writing, focus group discussion and a combination of several methods. The three major themes were identified as the advantage of using reflective learning, barriers to reflection and the improvement due to the use of reflection in nursing education and nursing practice. The use of reflective learning in education and nursing practice is very effective in improving the quality of nursing students. All stakeholders would benefit from an awareness of the value of reflective learning, which can be implemented in patient care.

**Keywords:** Education, Nursing, Reflective learning

### 1 INTRODUCTION

The aim of nursing education is to prepare nursing students to have an appreciation and concern for human dignity during their duties in clinical service. Concern and caring are developed in order to enhance the ability of future nurses in rendering service, not only for the community, but also for the individual patients under their supervision. Each individual will be aware of the benefits of using reflective learning. Reflective learning is a learning process that requires a great deal of time and practice. It is a dynamic process that involves thinking through the issues ourselves, asking questions and seeking out related information in order to gain understanding. Reflection was found to develop students' self-awareness and self-confidence (Smith & Jack, 2005). Reflective learning has an advantage for the students' learning. Glaze (2002) discovered that critical reflection improved students' learning through a process of perspective transformation.

### 2 METHOD

The goal is to systematically review and synthesise the evidence from all of the published qualitative studies on reflective learning in supporting nursing practice. This integration of information from various qualitative studies may present a series of themes for the better understanding of the usage and effectiveness of reflective learning in nursing practice.

## 2.1 Research strategy

The literature is presented in a systematic review. The ProQuest, EBSCO, and Cengage libraries were searched from 1st January 2014 through to 31th March 2016, with the use of the terms reflective learning, reflective practice or reflective thinking, reflective writing or reflective journals, and nursing practice. These keywords were searched independently and in combination. In this first step of the search process, 177 articles were identified.

## 2.2 Inclusion and exclusion criteria

Published articles that met the following criteria were included: the study should be in English; the participants are nursing students who are still studying or have recently graduated, Register Nurse (a nurse who has graduated from school nursing and has passed a national licensing exam) and the tutors. The studies must utilise qualitative methods on the research topic: reflective learning or reflection as a method of research, which includes reflective practice, reflective thinking, reflective writing and reflective journals. If duplicated studies were identified, only the most recent study was included. Only studies published as full text articles were involved in the review. Studies that were published only in abstract form were excluded.

## 2.3 Data extraction

The following general information was extracted from each article: language, author, year of publication, full text available, detail about the subject, and the method. The result of the systematic literature search is show in the following Figure 1:

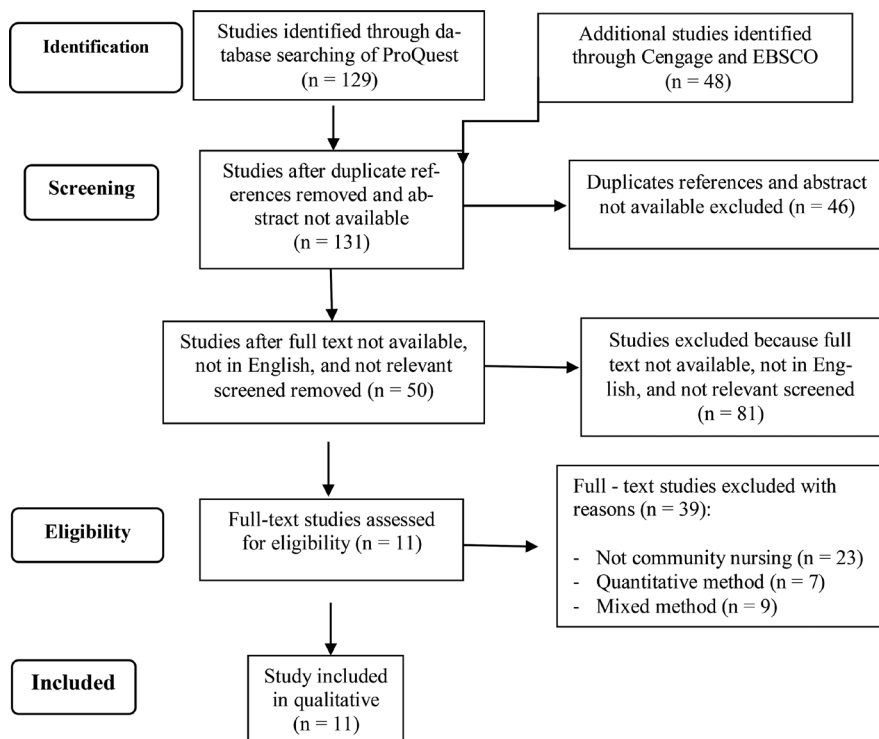


Figure 1. Results of the systematic literature search (Mother et al., 2009).

## 2.4 Data analysis

We included qualitative studies that used interviews, focus groups or observation on the use of reflective learning, and reflective writing in nursing practice. We excluded studies if they had duplicates references and the abstract was not available. Non-English articles were excluded in order to prevent a cultural and linguistic bias in translations. We excluded studies if they used mixed methods in their studies or reported only quantitative data. Studies that did not elicit data from the practice of nursing students within the scope of the hospital were also excluded.

## 3 RESULT

Out of the 50 studies that were examined, 11 studies meet the inclusion criteria. The variables used for the study design was reflective learning, including reflective thinking, reflective writing, reflective case study, reflective interview, reflective action and reflective experiences. The participants involved in the 11 studies consisted of 24 register nurse students, 315 nursing students, and 11 tutors in nursing. The purposes of most of the studies was to explore the perception and the effectiveness of reflective learning in enhancing the learning experience of nursing students. The same statement was also expressed by ter Maten-Speksnijder, et al. (2012) about the purpose of their study, which was to describe learning opportunities in the reflective case study, was used as an educational tool to inform future curriculum development. The other purpose of the studies was to explore how different didactic strategies support nursing students' experiences of learning during the first year of a reconstructed nursing curriculum (Westin et al., 2015; Willemse, 2015; Lister, 2012). Williams and Burke (2015) have a few objectives in their study: to analyse nursing students' stories and to understand how students develop a sense of being a nurse while pursuing a nursing degree. The use of reflective learning as a method in studies, could obtain data with regards to nurses' attitudes and goals in carrying out their profession. Many methods are used in reflective learning, such as reflective thinking, reflective writing, reflective case study, reflective experience, and reflective action.

### 3.1 Advantage of using reflective learning

The first theme is the advantage of using reflective learning. Some participants in the study stated that reflective learning increased their motivation in taking nursing education. The nursing students stated that they became more courageous in various situations. They trusted their ability and developed increased self-confidence. The students also believed in the importance of challenging their abilities and being themselves (Westin et al., 2015). The awareness of caring for the whole patient increased with the use of reflective learning (Westin et al., 2015; Williams & Burke, 2015). Several participants included the word "awesome"- as they reflected on learning experiences that caused them to "feel like a nurse" (Lister, 2012, p.111). Students have reflective ability (Silvia et al., 2012; ter Maten-Speksnijder et al., 2012), and student preconceptions of reflection, based on previous experience, shaped their perception of the benefits of the use of reflection in their current course. All students and tutors believed that reflection improved nursing practice and one tutor included benefits to future practice (Stirling, 2015).

The discussions suggest that reflective learning and the use of stories about the experience of giving and receiving care can contribute to the development of the knowledge, skills and confidence that enable student nurses to provide compassionate relationship-centred care within the practice (Adamson & Dewar, 2015). Positive learning experiences included access to a variety of clinical cases and information, the creation of a learning platform and the availability of educators and peers to answer questions (Willemse, 2015). Reflective experience provides benefits to participants, as mainly described incidents they had experienced; for example, patient data, doctor action, nurse action, treatment, communication, experience, and outcome. This experience will increase the confidence of students nurses (De Swardt et al., 2012).

### 3.2 *Barriers to reflection*

The second theme was barriers to reflection. Participants described faculty personalities and interactions as having very personal and significant impacts on their learning. It was reported that negative experiences were reported during reflective sessions due to the students taking advantage of each other and verbally the faculty members who did not like it if the student spoke frankly. This would result in a “tense classroom”, which “made it hard to concentrate and learn” (Lister, 2012, p.102). All students and tutors thought that previous negative experiences of reflection impacted upon the students’ perception of reflection. Too much reflection in post registered nursing education was reported to be burdensome (Stirling, 2015). In addition, it was also noted that study participants found themselves in a place full of disputes, which in some cases threatened the relationship with the student/instructor. Furthermore, reflective writing that was written by the participants, which described the instability in the clinical setting, was perceived as a source of stress for the participants and seemed to threaten the student-instructor relationship by decreasing tolerance and producing unfair expectations (Shahsavari et al., 2013).

### 3.3 *Improvements in the use of reflection in nursing education and nursing practice*

The last theme is the improvement in the use of reflection in nursing education and nursing practice. Stirling (2015) argued in his research that all students believed that reflection would be more beneficial if the students were given time to reflect on something they identified as important. Moreover, all students and tutors expressed the need to explore different models of reflection in order to maximise effectiveness. Reflective learning helps students to gain insights into nursing and increase one’s self-awareness (Westin et al., 2015). Some participants ask students with extensive health care experience to note problems with their earlier experiences that they did not previously consider. They discovered many ways to care for patients and that they needed to utilise new strategies and knowledge for each unique situation. Furthermore, the students reported that a clinical placement early in the first semester was valuable for their learning. They became involved in real patient situations and had opportunities to care for patients in the early stages of the programme. The participants expressed reflective experience through focus group discussion (Lister, 2012). Clinical experiences also helped to develop a professional identity. Some participants expressed their awareness of growth while they were in school. Studies conducted by Willemse (2015), used electronic reflections. As a result, participants reflected that the electronic reflection discussions created an online discussion trail that allowed them to go back to information and use it in preparation for assessments.

## 4 DISCUSSION

Learning is equivalent to “finding meaning” and always implies schematisation and embodies new experiences. Learning implies construction and the approval of an interpretation that determines action (Silvia et al., 2012). The reflective practice could be described as a deliberate cognitive and affective exploration of experiences with the purpose of learning from experiences (Chapman et al., 2009). Different methods can be used for reflection, for example, reflective diaries, journals or writing, reflective group discussions, reflective experience and guided reflection. Reflective learning is the process of internally examining and exploring an issue of concern, triggered by an experience, which creates and clarifies meaning in terms of self, and which results in a changed conceptual perspective (Boyd & Fales, 1983). This process is central to understanding the experiential learning process. Reflective learning is a practice that facilitates the exploration, examination, and understanding of feeling, thinking and learning. It is a thoughtful consideration of academic material, personal experiences, and interpersonal relationships. It is a form of internal inquiry that extends the relevance of theory and deepens their understanding of the practice of everyday life and work. It is necessary, for education and nursing practice, to assess and evaluate all their quality of

care. The most important aspect of reflective learning is a process in which people can learn about themselves. Furthermore, students knew where they made mistakes and could understand why the error occurred; therefore the same mistake will not be repeated. They discover their abilities and improve their self-confidence. Moreover, several studies also showed an increase in the quality of graduated students. Students will learn to recognise themselves, their abilities and their strengths, and will recognise senior habits and patterns of work in which they participate.

## 5 CONCLUSION

In conclusion, the use of reflective learning in education and nursing practice is very effective in improving the quality of nursing students. It is recommended that reflective learning should be included as a teaching and learning strategy method to enhance theory and practice integration in nursing. All role players, such as nurse educators, professional nurses, mentors, and preceptors, would benefit from an awareness of the value of reflective learning, not only for patient care but also for nurses' self-development.

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## Determinants of nursing licensure examination performance: A literature review

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**ABSTRACT:** Implementation of the Indonesian Nursing National Competency Test is facing several challenges. These issues have been a significant concern for every nursing school. The purpose of this study was to systematically review the existing literature to identify determinants or contributing factors in NLE (National Licensure Examination) performance. A multiple database search was used and out of 1,735 articles, 19 articles were reviewed which met both inclusion and exclusion criteria. The systematic review yielded two emerging themes in determining contributing factors to NLE performance namely: academic factors (cumulative grade point average, science subject scores, nursing subjects scores) and non-academic factors. Understanding the contributing factors to NLE performance is important not only for the nursing institutions but also for students and the faculty. The findings of this study provide deeper insights; contributing to the repository of knowledge of determinant or risk factors as bases for programme development for the success in the NLE performance.

### 1 INTRODUCTION

The implementation of the Indonesian Nursing National Competency Test (INNCT) has been facing several challenges, such as facilities and technical problems (internet connection, electricity, etc.), pass rate, and pass grade. The pass rate of period I/2015 was 45.45% and period II/2015 was 53.61% (Ristekdikti, 2016). These issues have been a significant concern for every nursing school, because they reflect the quality of the teaching process in the schools. There have been many studies conducted into National Licensure Examination (NLE) performance. This study aims to explore the determinants of NLE performance. The results could serve as database in preparing nurse graduates to perform better on the NLE.

### 2 METHOD

This systematic review study followed the Preferred Reporting Items for Systematic review and Meta-Analysis (PRISMA) protocol (See Figure 1). This involved conducting a systematic search of the literature using full electronic databases, including ProQuest®, OVID®, EBSCO®, JSTOR and PubMed® and a manual search of literature that appeared in the period from 2006 to March 2017. Inclusion criteria for this study included: research articles were written only in English, written within a ten-year period (2006–March 2017), peer-reviewed, has free full text, is published in a scholarly journal, and employed quantitative studies. The risks of bias include: the various published sources; the selection process used which consist of only five databases; and heterogeneity of the licensure examination or methods of the studies.

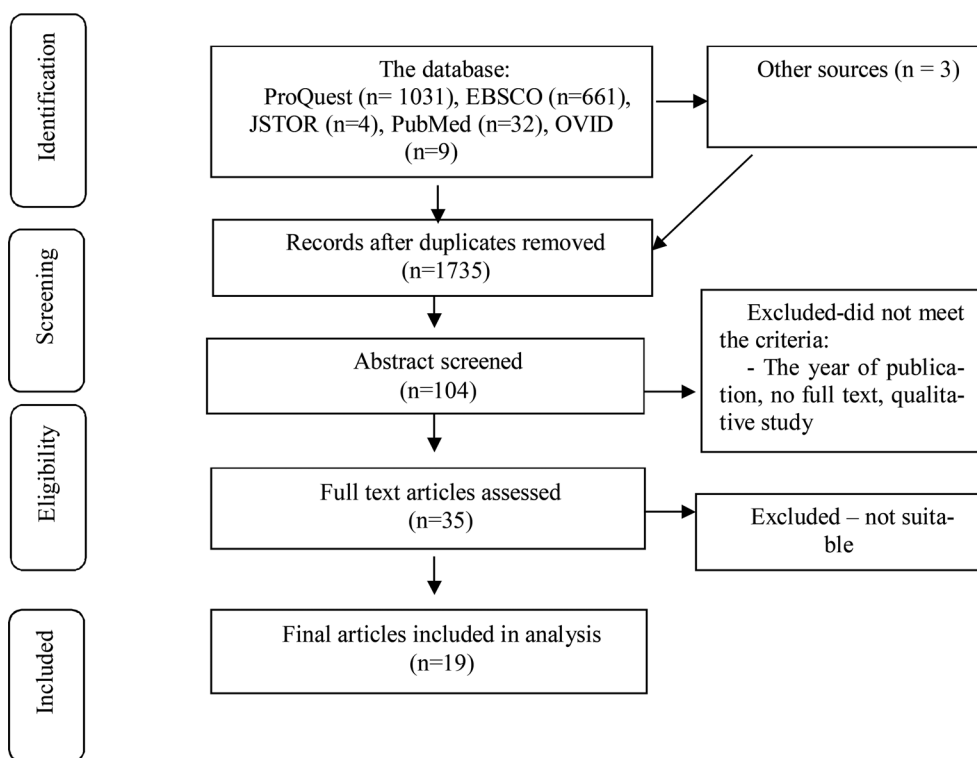


Figure 1. Flow diagram of reviewing process.

### 3 RESULTS

#### 3.1 Academic factors

##### *Cumulative Grade Point Average (CGPA)*

The CGPA was considered as a significant predictor for NLE performance in several studies. Amankwaa et al. (2015) stressed that there was a strong association between CGPA and the NLE performance. Penprase et al. (2013) believed that overall GPA was increasing the probability of the pass rate. The higher the GPA, the higher is the possibility of passing the NCLEX-RN (National Council Licensure Examination for Registered Nurses) examination. Participants who were successful on the licensure examination at the first attempt had a 0.3 higher mean nursing GPA than those students who were unsuccessful (Gilmore, 2008). GPA demonstrated moderate positive correlations with NCLEX-RN success (Foley, 2016). The CGPA was found to have a significant relationship to, and could be predictive of, first-time success on the NCLEX-RN for graduates of the nursing programme (Reeve, 2014). A significant relationship was identified between the two variables ( $r = 0.180$ ,  $p < 0.01$ ) s GPA and the NCLEX-RN passing rate (Outlaw et al., 2013). Simon et al. (2013) argued that the GPA is a predictor of NLE score. In contrast, Ukpabi (2008) contended that there was no significant correlation between NCLEX-RN and GPA ( $p = 0.676$ ).

#### 3.2 Science subject scores

Breckenridge et al. (2012) stated that the best single predictor of NCLEX-RN passing rate was the science GPA, followed by the undergraduate GPA prior to the nursing major. Simon et al. (2013) supported that student performances in biology and chemistry courses are linearly associated with NLN (National League for Nursing)-readiness scores. Shirrell,

(2008) believed that the critical thinking score is predictive of success on the NCLEX-RN ( $F = 7.987$ ,  $p = 0.0001$ ). Romeo (2013) maintained that the assessment test composite score ( $p = 0.013$ ) and the critical thinking composite score ( $p = 0.008$ ) were statistically significant as predictors of passing the NCLEX-RN for the first time. However, different results were found by McGahee et al., (2010) who explained there was no significant correlation between several variables such as science GPA, fundamentals of nursing, health assessment and pathophysiology. But, there were significant interactions that indicated that certain combined variables such as between the science GPA: fundamentals ( $p = 0.002$ ), science GPA: health assessment ( $p = 0.04$ ), science GPA: pathophysiology ( $p = 0.02$ ) could be determinants for NLE performance.

### 3.3 *Nursing subjects scores*

Breckenridge et al. (2012) established that the undergraduate GPA prior to the nursing major is a significant predictor of passing the NCLEX-RN. Schooley & Kuhn (2013) recognised that the final course grade was significantly predictive of the HESI test ( $p < 0.01$ ). McGahee et al. (2010) explained that the main effects that were most significantly related to NCLEX-RN success were the RN (Registered Nurse) assessment test and theoretical foundations and pathophysiology. Penprase et al. (2013) showed several variables were significant contributors to predicting success on NCLEX-RN such as Comprehensive Adult Nursing I ( $p = 0.004$ ) and pathophysiology. Abbott et al. (2008) found that there are statistically significant findings on the senior complex care grades and NCLEX-RN ( $p = 0.02$ ). Simon et al. (2013) concluded that all nursing courses independently predict NLN-readiness scores. Romeo (2013) showed that the nursing GPA ( $p < 0.001$ ) was the most powerful predictor of the first-time NCLEX-RN pass rate. In addition, Leon (2016) indicated there was low correlation ( $p < 0.001$ ) between NLE performance and academic performance. Nacos-Burds, (2010) found that the practical nursing core GPA was found to be a significant predictor of NCLEX-RN success. In line with the previous mentioned study, McGahee et al. (2010) point out that there was no significant correlation between several variables such as health assessment and pathophysiology and NLE performance.

### 3.4 *Non-academic factors*

Amankwaa et al. (2015) found that there was no statistically significant correlation between sociodemographics such as: gender ( $p = 0.288$ ), age ( $p = 0.180$ ), Christian religion ( $p = 0.210$ ), description of home community ( $p = 0.919$ ), mother's education ( $p = 0.917$ ), and father's education ( $p = 0.796$ ) and performance in licensure examination. Breckenridge et al. (2012) identified that the best predictor of NCLEX-RN pass rate was family income. Benefiel (2011) addressed that gender, ethnicity, and age shown did not have a significant relationship with NCLEX-RN performance. Another study by Whitehead (2016) recognised that the gender and age of the students were not significant predictors of NCLEX-RN performance. Gutierrez (2016) presented that there was significant correlation between the school accreditation status and board performance. Simon et al. (2013) suggest that the transferred students and GPA were significantly predictor of the NLN (National League for Nursing) score Ukpabi (2008) discovered that out of 18 predictor variables in the Assessment Technologies Institute (ATI), only 11 were significant in predicting pass rates of the NCLEX-RN such as: critical thinking, Test of Essential Academic Skills (TEAS), reading, maths, English, mental, pharmacology, fundamental, National League Nursing (NLN) Adult1, NLN adult2, and NLN Paediatric.

## 4 DISCUSSION

Understanding the contributing factors to NLE performance is important not only for the nursing institutions but also students, and the faculty Passing the licensure examination is

required for registration and practice as a nurse. The licensure examination is designed to identify candidates who possess the theoretical knowledge to practice as an entry-level nurse. The findings from this study indicate that the academic factors are the most researched and provide strong evidence to predict success on the NLE. Student's GPA, science score and nursing subjects have a stronger value compare to others (Amankwa et al., 2015; Penprase et al., 2013; Simon et al., 2013; Gilmore, 2008; Reeve, 2014; Outlaw et al., 2013). It is essential a lecturer can monitor students' progress and support them every semester to achieve high grades in every subject. The students could think to attend a special programme to improve their knowledge.

Non-academic factors such as gender, age, religion, parent's education background and family income were mentioned in the studies but not all have significant correlation with the NLE performance. Previous studies did not support the relationship between age, gender, religion, parent's education background and NLE performance (Amankwa et al., 2015; Benefiel, (2011) Whitehead, 2016). This finding is inconsistent with the findings from other researchers who assert that older students perform better (Simon et al., 2013). Accreditation status and level have a significant relationship with NLE performance. Accreditation is the process by which schools are evaluated based on specific standards to ensure the quality of the learning process. It can stimulate institutions to achieve maximum standards and to identify schools whose competence in a particular field warrants public and professional recognition (Gutierrez, 2016). Accreditation is a process that is recognised worldwide as an external quality assurance.

## 5 CONCLUSION

There is much work to be done to advance the identification of determinants of NLE performance. Several significant predictors were identified as academic and non-academic factors. Testing this finding could be a great input as basis for reflection and improvement. Nursing schools should think in terms of updating curricula, teaching styles, or special programmes to support student performance.

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## The effect of a kaleidoscope on pain relief during a venepuncture procedure in children in Padang, Indonesia

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**ABSTRACT:** Various nursing actions and treatment procedures in hospital often cause pain in sick children. The purpose of this study was to analyse the effect of distraction with a kaleidoscope on pain and vital signs. A quasi-experimental investigation was developed in the Emergency Department of Dr M. Djamil Hospital Padang, West Sumatra Province, Indonesia. A consecutive sampling technique was utilised with 20 children being selected. The children were randomly divided into two groups. The mean pain score in the experimental group was 0.80 and in the control group was 3.40, as measured using the Wong-Baker Faces Pain Rating Scale (WBF-PRS). The Mann-Whitney *U* test indicated that there were differences in both groups ( $p = 0.038$ ), with kaleidoscope therapy decreasing diastolic blood pressure ( $p = 0.018$ ) and respiratory rate ( $p = 0.024$ ). The kaleidoscope was a very effective distraction during venepuncture to minimise pain and physiological response. It is suggested that nurses can employ distraction as a routine care element, especially when applying medical procedures.

**Keywords:** pain, distraction, kaleidoscope, vital signs, venepuncture

### 1 INTRODUCTION

Pain is a subjective experience that commonly occurs in children and can be caused by actual or potential tissue damage. Pain in children is difficult to accurately identify. Consequently, pain management can be ineffective and cause negative impacts such as increased intensity, frequency, duration or degree of pain-related damage to children's bodies (Truba & Hoyle, 2014). Pain can have a detrimental influence for physical, emotional, behavioural, cognitive and psychological aspects (Czarnecki et al., 2011; Taddio et al., 2010). Adverse effects can occur such as fear, anxiety and refusal for subsequent procedures (Czarnecki et al., 2011; Taddio et al., 2010), syringe phobia (Taddio et al., 2010), aggressive behaviour and distrust of health care workers (Czarnecki et al., 2011). In addition, physical aspects can affect body systems like cardiopulmonary function, metabolism and the immune system (Czarnecki et al., 2011).

Venepuncture is one of the minor medical procedures that are performed and cause acute pain in children (Sikorova & Hrazdilova, 2011). Venepuncture is the second most common procedure that can cause moderate to severe pain in children (Stevens et al., 2011), and Hartling et al. (2013) stated that venepuncture and intravenous infusion are the most common procedures in the emergency department.

Professional nurses should understand the importance of pain management (Wong et al., 2012). Pain management is divided into two approaches, namely pharmacological and non-pharmacological (Taddio et al., 2010). Distraction is one of the non-pharmacological interventions that distracts children's attention from painful stimuli (El-Gawad & Elsayed, 2015), a cognitive-behavioural approach to decreasing pain during invasive procedures on children in the emergency department (Wente, 2013). Distraction is a nursing intervention that is easy, inexpensive, and effective (Bagheriyan et al., 2012), and adjusts vital signs in the physiological response of pain (El-Gawad & Elsayed, 2015; Kiani et al., 2013).

Many experimental studies on distraction reduce pain significantly, including the use of kaleidoscopes (Birnie et al., 2014). A kaleidoscope is a toy that attracts children's attention when they look into it, so that they do not focus on the pain of invasive procedures (Tüfekci et al., 2009). Canbulat et al. (2014) stated that using a kaleidoscope may result in lower pain scores in school-age children during venepuncture. In Indonesia, the study of distraction with a kaleidoscope as a form of pain management has not yet been undertaken. Thus, the purpose of this study was to determine the effect of distraction using a kaleidoscope as a form of pain relief for children undergoing venepuncture.

## 2 METHODS

The method was a quasi-experimental, aiming to provide an overview of each variable and determine the effect of distraction using a kaleidoscope on reducing pain scores and changing the vital signs of children undergoing venepuncture. The population involved children who visited the emergency department. The sampling method was consecutive, yielding a total of 20 samples.

The inclusion criteria were: 1) aged 6–11 years old; 2) undergoing venepuncture; 3) able to communicate verbally and non-verbally; 4) parents are willing to be respondents. Exclusion criteria were: 1) in a critical condition; 2) uncooperative parents. The research was conducted from 11 August to 3 October 2016 in the Emergency Department of Dr M. Djamil Hospital, Padang. Data collection was conducted using the Wong-Baker Faces Pain Rating Scale (WBF-PRS), wrist blood pressure and a stopwatch.

This study obtained ethical clearance from the Ethical Commission of the Faculty of Medicine, University of Andalas. The parents provided written informed consent prior to data collection. Confidentiality was guaranteed regarding information and the children's identity. The statistical test applied to prove the hypothesis was the Mann–Whitney *U* test, as the data were not normally distributed ( $p < 0.05$ ).

## 3 RESULTS

Table 1 illustrates that most of the children in both groups were nine years old. In terms of gender, the control group was dominated by male children, while the experimental group had an equal number of both sexes. Regarding previous experience of venepuncture, most children in the control group had a previous history. Meanwhile, more than half of the children in the

Table 1. Respondent characteristics by age, gender and experience of blood sampling.

	Control	Experimental
Characteristic	<i>f</i> (%)	<i>f</i> (%)
Age (years):		
6	0 (0)	2 (20)
7	2 (20)	2 (20)
8	2 (20)	1 (10)
9	4 (40)	3 (30)
10	1 (10)	0 (0)
11	1 (10)	2 (20)
Gender:		
Male	7 (70)	5 (50)
Female	3 (30)	5 (50)
Previous venepuncture:		
No	3 (30)	4 (40)
Yes	7 (30)	6 (60)

Table 2. Comparison of pain level felt by children during the procedure.

Variable	Group	Mean	Min	Max	<i>p</i> value
Pain score	Control	3.40	0	4	0.038
	Experimental	0.80	0	8	

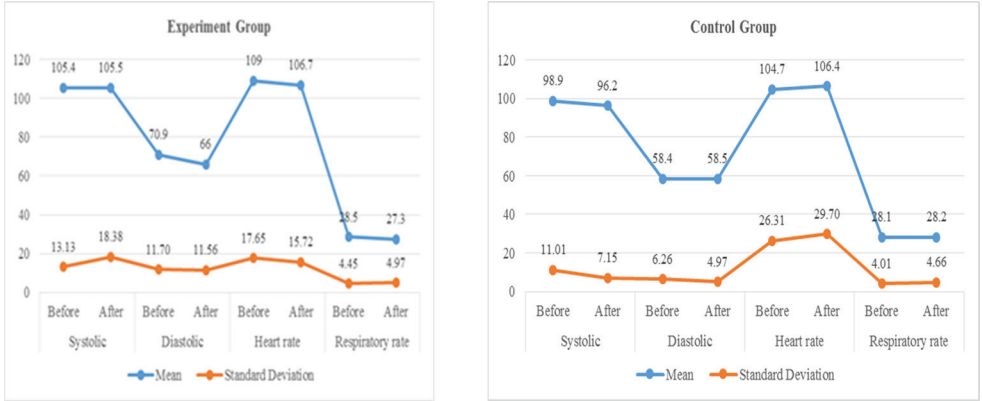


Figure 1. Comparison of vital signs before and after distraction during the procedure.

Table 3. Vital signs comparison between control and experimental groups after the procedure.

Variable	Group	Mean	SD	<i>p</i> value
Systolic b.p.	Control	96.20	7.146	0.153
	Experimental	105.50	18.380	
Diastolic b.p.	Control	58.50	4.972	0.076
	Experimental	66.00	11.557	
Pulse rate	Control	106.40	29.703	0.978
	Experimental	106.70	15.702	
Respiratory rate	Control	28.20	4.662	0.681
	Experimental	27.30	4.968	

experimental group had a history. Table 2 indicates that there was a significant difference in pain scores between the control and experimental groups, with a *p* value of 0.038.

From Figure 1, the *p* values of systolic blood pressure and pulse rate were 0.977 and 0.225, respectively. This shows that there was no significant difference in systolic blood pressure and pulse rate before and after administering distraction. Meanwhile, *p* values of diastolic blood pressure and respiratory rate were 0.018 and 0.024, respectively, which means that there was a significant difference before and after venepuncture using the kaleidoscope. Looking at the *p* values in the control group for systolic and diastolic blood pressures, pulse and respiratory rate, they were, respectively, 0.175, 0.614, 0.323 and 0.780. The figure shows that there was no significant difference before and after venepuncture.

As displayed in Table 3, all *p* values were above 0.05, indicating that there was no significant difference between the control and experimental groups after venepuncture.

4 DISCUSSION

The average pain score in the experimental group after kaleidoscope distraction was 0.80. The lowest value was 0 (no pain) and the highest was 4 (slightly more painful). Overall, most

respondents did not feel any pain during venepuncture while using the kaleidoscope. However, the average pain score of the control group was 3.40. The lowest value was 0 and the highest was 8 (very painful). Overall, most respondents felt pain ranging from slightly painful to very painful and only a few children had no pain during venepuncture. The statistical analysis proved that there was a significant difference in pain scores between the experimental and control groups. The present findings seem to be consistent with other studies that found that a kaleidoscope significantly reduced pain (Karakaya & Gözen, 2015; Canbulat et al., 2014; George & Vetrisevi, 2015).

There are possible explanations for this result. The selection of a proper distraction for children is very important, so that their attention can be diverted from the painful procedure (Bagheriyan et al., 2012). A kaleidoscope as a visual distraction that produces shapes and colours can be an option (Canbulat et al., 2014). It is not only its shape and colour but also when the kaleidoscope is circling, it creates various colours and shapes such as beads which are uniquely adapted to the movement (Tüfekci et al., 2009). Children's focus on the kaleidoscope can distract them from painful procedures. Another possible explanation for this is that distraction can provide an analgesic effect by altering a person's emotions (Johnson, 2005). These can be changed by providing a distraction that reduces anxiety and then improves mood and motivation. As a result, pain can be minimised, as the attention has been shifted. In addition, distraction can also effectively reduce pain due to the child's willingness to use it. The shapes and colours inside a kaleidoscope encourage children to use it during treatment. Johnson (2005) noted that distraction is an effective and useful method if children are willing to use it.

Diastolic blood pressure before venepuncture was 70.90 and declined thereafter to 66.00, with a  $p$  value of 0.018. This means that there was a significant difference in average diastolic blood pressure before and after venepuncture with distraction. A similar trend was found in respiratory rate, where an average of 28.50 was recorded before venepuncture and decreased thereafter to 27.30, with a  $p$  value of 0.024. This result is in agreement with the findings of El-Gawad and Elsayed (2015), which reported a decrease of systolic and diastolic blood pressures, pulse and respiratory rate, with  $p$  values, respectively, of 0.014, 0.023, 0.001 and 0.002 in the experimental group before and after the distraction. This means that distraction had a significant influence on vital signs.

What is surprising is that the kaleidoscope did not affect systolic blood pressure and pulse rate. In this study, there was a slight increase in systolic blood pressure. It seems that these results are possible due to the fact that some of respondents have problems with their kidneys. Kidney problems can lead to intravascular fluid changes that have an impact on stimulation of the sympathetic nervous system (Craven & Hirnle, 2009). Meanwhile, the pulse frequency slightly decreased. Distraction can help minimise pain and anxiety that impact on the vital signs. In line with Farrokhnia et al. (2011), distraction can reduce the chemical and physiological changes resulting from anxiety and discomfort due to invasive procedures. It will inactivate the autonomic nervous system, hence there is no increase in vital signs. Therefore, distraction is very efficient and considered for use in such invasive procedures.

In the control group, the current study found that the systolic and diastolic blood pressures went down after venepuncture, while the pulse and respiratory rate rose thereafter. To our surprise, no differences were found in vital signs before and after the procedure. This result is in agreement with the findings of McClellan et al. (2009), which revealed that the pulse rate did not show any significant differences before and after venepuncture. In contrast, Hosseini et al. (2016) reported that there were differences in vital signs before and after a bone marrow aspiration without distraction. A possible explanation for this might be that the pain felt by the individual in the control group may cause changes in vital signs. In accordance with Farrokhnia et al. (2011), the signal of pain is received by the hypothalamus, which then stimulates the sympathetic nervous system, causing an escalation in pulse rate and blood pressure and uplifts in intake of oxygen.

This study indicates that there was no difference in vital signs of both groups after the procedure. These results matched those observed in earlier studies. Hosseini et al. (2016) indicated that there was no significant difference in the vital signs after the procedure. Further,

these findings supported the results of Hartling et al. (2013) who also found no significant difference in pulse rate during invasive procedures between a group receiving music therapy and a control group. A possible explanation for these results may be due to the activation of the autonomic nervous system, which is caused by pain, anxiety, exercise and changes in intravascular volume (Craven & Hirnle, 2009).

In this study, there were haemophilia patients in the control group. Haemophilia can cause a fluid volume deficiency. Lack of fluid volume can reduce a child's blood pressure (Craven & Hirnle, 2009). This may cause the blood pressure in the control group to be lower than in the experimental group. In terms of respiratory rate, the control group had a higher rate than the experimental group. This may happen due to the stress of hospitalisation for children (Craven & Hirnle, 2009). The limitations of this study include the number of samples that are lacking, as well as the diagnosis of diseases as a difference that may influence the vital signs.

## 5 CONCLUSION

This study concludes that distraction using a kaleidoscope can effectively reduce pain and vital signs adjustment. There was a significant difference in pain scores between the experimental and control groups. A kaleidoscope can be an option for nurses to minimise pain in children due to invasive measures such as venepuncture.

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## Analysis of phlebitis occurrence in terms of the characteristics of infusion by nurses in RSI Ibnu Sina Payakumbuh

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**ABSTRACT:** The purpose of this study is to determine the level of nurse compliance in using aseptic techniques to install an infusion and its relationship with the phlebitis incidence in RSI Ibnu Sina Payakumbuh. This study is a descriptive analytic study using cross-sectional methods and applying a proportional stratified random sampling technique. This research uses observation sheets based on Standard Operating Procedure (SOP) at RSI Ibnu Sina Payakumbuh as the instrument. The instrumentation of phlebitis occurrence is based on the phlebitis grade in the standard practice of the Infusion Nurses Society (INS). The results revealed a phlebitis incidence of 25.6%, while the nurse compliance was 55.8%. Bivariate test results indicate a  $p$  value of 0.012 ( $< 0.05$ ), which shows a relationship between nurse compliance in using aseptic techniques during the installation of an infusion and the phlebitis incidence in RSI Ibnu Sina Payakumbuh.

**Keywords:** phlebitis, infusion characteristics, nurses

### 1 INTRODUCTION

Hospitals provide health services in the form of inpatient, outpatient and emergency services (Permenkes RI No. 340/PER/III/2010)(Depkes RI,2010). Every medical action always puts patient safety first and minimises risk. This aims to improve safety, avoid injury and improve the quality of care (Susianti, 2008). to measure continuous safety (Darmadi, 2008). Patient safety is focused on reducing nosocomial infections, decubitus and drug delivery errors, and ensuring patient satisfaction with healthcare. Nosocomial infection is an infection that occurs in patients while in hospitals or other health facilities (Darmadi, 2008). Previous nursing contact (even up to 24 hours) with the patient plays an important role in contributing to the incidence of nosocomial infection (Nursalam, 2011). A WHO study showed that approximately 8.7% of 55 hospitals in 14 countries in Europe, the Middle East, South-East Asia and the Pacific, and as many as 10.0% of hospitals in South-East Asian countries, reported cases of nosocomial infections, known as Hospital-Acquired Infection (HAI) (Putri, 2016). Among the many types of nosocomial infections, phlebitis ranks first compared to other infections (Brunner & Suddarth, 2013). Phlebitis has become an indicator of a hospital's minimum service quality, with an incidence standard of  $\leq 1.5\%$  (MOH Department of Health, 2008). In Indonesia, there is no defined incidence of phlebitis, probably because studies and publications related to phlebitis are rare. Data from Department of Health the Indonesian Ministry of Health (MOH Department of Health) in 2013 showed that the amount of phlebitis incidence in Indonesia was 50.11% for public hospitals and 32.70% for private hospitals (Department of Health-MOH, 2013). Many factors cause the occurrence of phlebitis. One factor is the aseptic or sterile techniques used during infusion. Disinfection of the area around the puncturepiercing with 70% alcohol, and sterilisation of the tools used play an important role in avoiding inflammatory complications. This can be done by, for example, washing hands before taking action and disinfecting the area around the puncture (Brunner & Suddarth, 2013). The presence of bacterial phlebitis can be a serious problem, as it predisposes to systemic complications

(septicaemia). Factors contributing to the incidence of bacterial phlebitis include inadequate handwashing techniques, incomplete aseptic techniques at the time of piercing, poor catheter insertion techniques, and prolonged installation. The principle of the installation of intravenous (IV) therapy takes into account the principle of sterilisation. This is done to prevent contamination caused by intravenous needles (Rizky, 2014).

The results of research conducted by Mada et al. (2012) at Christian Hospital Lende Moripa found an inadequate application of the sterile infusion principle of 64.3% (36 persons). The application of the sterile principle involves its application prior to the installation of the IV, while performing the action, and when cleaning the appliance. Such applications are said to be sufficient if they fit the correct sterile infusion technique. Based on data from the Indonesia Infection Prevention Supervisory Team (IPCN) and the nosocomial infection control team in hospitals in 2015, an average of 28 cases, or about 5.9% of cases, of phlebitis occur in RSI Ibnu Sina Payakumbuh every month. From observations of six nurses (two nurses were assigned at random), it was found that two nurses had washed their hands both before and after intravenous treatment and four other nurses simply washed their hands after intravenous treatment. information head of the internal medicine room says that phlebitis is a complication of infusion. The role of nurses in reducing the incidence of phlebitis is very important, because the nurse is the operator who performs the infusion installation. Among the many factors that cause phlebitis, the aseptic technique performed by the nurse at the beginning of the IV should be of concern.

## 2 METHOD

This study uses descriptive analytical research with a cross-sectional approach. The aim is to analyse the incidence of phlebitis in terms of the infusion characteristics used by nurses at RSI Ibnu Sina Payakumbuh in 2016. The population is all of the nurses in the emergency unit, internal medical unit, operating room, and VIP room. A sample of 43 nurses met the criteria. The sampling used was a proportional stratified random sampling method (Arikunto, 2014). Research was for one month from 20 November to 20 December 2016. The research instrument is an observation sheet based on Standard Operating Procedure (SOP) at RSI Ibnu Sina Payakumbuh. The instrumentation of the occurrence of phlebitis is based on class phlebitis from the standard practice of the Infusion Nurses Society (INS). the incidence of phlebitis was assessed before 72 hours after intravenous infusion.

## 3 RESULTS

### 3.1 *Phlebitis occurrence*

Table 1 shows that there were 11 patients (25.6%) experiencing phlebitis in RSI Ibnu Sina Payakumbuh during the observation period.

### 3.2 *Characteristics of infusion installation based on stab location and catheter size of IV*

Table 2 shows that the infusion location was most often in the cephalic vein (74.4%) and the most common catheter size was number 18 (46.5%).

Table 1. frequency distribution of phlebitis occurrence (n = 43).

Variable	<i>f</i>	%
No phlebitis	32	74.4
Phlebitis	11	25.6

Table 2. Frequency distribution by installation location and size of IV catheter (n = 43).

Variable	<i>f</i>	%
a. Vena locations		
Metacarpal vein	7	16.3
Cephalic vein	32	74.4
Basilic vein	4	9.3
b. IV catheter		
Number 18	20	46.5
Number 20	14	32.5
Number 22	9	20.9

Table 3. Frequency distribution based on nurse compliance in carrying out the aseptic technique in the installation of the infusion (n = 43).

Variable	<i>f</i>	%
Compliance	19	44.2
Non-compliance	24	55.8

Table 4. Relationship between nurse compliance in using aseptic techniques for infusion and phlebitis in RSI Ibnu Sina Payakumbuh (n = 43).

Aseptic technique	Phlebitis occurrence						<i>p</i> -value
	No phlebitis		Phlebitis		Total		
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	
Compliance	18	94.7	1	5.3	19	100	0.012
Non-compliance	14	58.3	10	41.7	24	100	

### 3.3 Nurse compliance

Table 3 indicates that more than half of the respondents (55.8%) did not comply with the standard aseptic techniques when performing the infusion.

### 3.4 Bivariate analysis

Table 4 shows that the phlebitis incidents in this study happened more frequently among nurses who were non-compliant when using aseptic techniques for the infusion (41.7%). The statistical test (chi-squared) resulted in a *p* value = 0.012 (< 0.05). This indicates that there is a significant relationship between nurse compliance when using aseptic techniques for the infusion installation and phlebitis incidence.

## 4 DISCUSSION

This study found a relatively high incidence of phlebitis (25.6%) in RSI Ibnu Sina Payakumbuh, compared with the standard  $\leq 1.5\%$  set by the Ministry of Health. This high number can damage the quality of hospital services. In addition, a significant association between a nurse's compliance when using infusion aseptic techniques and incidences of phlebitis was also identified. Forecasting researchers showed that less than half (48.8%) of nurses washed their hands before performing aseptic techniques. In fact, handwashing should be done both

before and after the action (Nursalam, 2011), although the nurses also use gloves and other protective equipment. Handwashing is important in order to reduce the spread of microorganisms that are present on the hand, such that the spread of infection can be minimised and the working environment is protected from infection. In addition, all nurses can use 70% alcohol as a disinfectant. This suggests that the area to be penetrated can be disinfected with an antiseptic solution, such as providone, iodine, 70% alcohol, or chlorhexidine (Perry and Potter's (2005) and did not touch the disinfected area as much as (27.9%), only 32.6% nurses did well.. A nurse ideally has a basic knowledge of the various theories related to infusion therapy. This will affect their behaviour, especially with respect to the principles relating to the prevention of complications. Nurses should be aware of the principles and techniques of asepsis, including stability, storage, labelling, interaction, dosage and calculation, and also of the appropriate equipment needed to provide safe infusion therapy to patients (Wayunah, 2012). In addition, the infusion action is delegated to the nurse, so the nurse must understand the correct methods and techniques to infuse, administer intravenous fluids and maintain intravenous systems (Potter & Perry, 2005). The incidence of phlebitis in our study was also due to more infusions being applied to the metacarpal vein (28.6%) than the other two veins. The results are in line with the studies of Lindayanti and Priyanto (2013), where the occurrence of phlebitis is based on the location of the intravenous catheter, which is most commonly placed in the distal venous region (45.5%). The location of the vein has a significant relationship with the occurrence of phlebitis because the distal blood vessels are closer to the joint and more easily moved, so that friction occurs in the vein wall due to intravenous catheters.

Potter and Perry (2005) suggested that changing the position of the limb, especially in terms of the wrist or elbow, can reduce the rate of infusion and affect blood flow. The use of a cephalic vein (located away from the wrist) is a better choice. The 6% incidence of phlebitis (the MOH standard is  $\leq 1.5\%$ ) is known by observing the location of the installation and by observing the signs and symptoms of phlebitis, including pain along the cannula, erythema, redness at the stabbing site, and fever (Potter & Perry, 2005). The high incidence of phlebitis in this study is also due to the incorrect application of standard infusion procedures, such as a nurse who does not properly wash their hands, does not wear / change gloves or does not use proper disinfection techniques, and contamination of the infusion equipment during installation.

Phlebitis is an acute inflammation of the internal venous layer that is characterised by pain along the vein, redness, swelling and warmth, and can be felt around the puncture area. Phlebitis is a complication that is often associated with intravenous therapy (Nursalam, 2014; Brunner & Suddarth, 2013). Phlebitis can be prevented by performing aseptic techniques during infusion, using the correct IV size for the patient's veins, choosing the right veins, the type of fluid, and most importantly, the disposal of the 72-hour aseptic mounting location (Brunner & Suddarth, 2013). Our study is in accordance with the research of Rusnawati (2015), where the incidence of phlebitis in the hospital is also high (45.4%). The incidence of phlebitis is one indicator of hospital service quality. By obtaining a  $p$ -value of 0.012 ( $< 0.05$ ) from the statistical test (chi-squared), it can be concluded that there is a significant correlation between compliance in using aseptic techniques for infusion installation and phlebitis occurrence. This relationship was also shown in previous research (Ince, 2010), which stated that there is a relationship between nurse compliance in applying standard infusion procedures and the occurrence of phlebitis. Phlebitis occurs due to the improper application of standard infusion procedures. The sterile principle in the installation is intended to prevent the entry of microorganisms during the installation of the infusion. According to Philip and Gorski, cited in Rusnawati (2015), aseptic techniques should be performed during every clinical procedure, including infusion, to reduce the risk of infection.

The results of our study indicate that with disinfection at the time of intravenous infusion using non-aseptic techniques, many (41.7%) have phlebitis. The study is in accordance with the statement of Phillips and Gorski, cited in Rusnawati (2015), that unsterile insertion sites are pathways for bacteria that can cause infection. This suggests that disinfection

using non-aseptic techniques may increase the risk of the occurrence of phlebitis. The study also showed that of the patients who were disinfected using aseptic techniques (44.2% of the total), 5.4% also had phlebitis. The occurrence of phlebitis in patients undergoing infusion using aseptic techniques may be due to other factors, such as the physical condition of patients who move too much and often fold the infusion hand. However, large size IVs can also cause phlebitis. According to Brunner and Suddarth (2013), phlebitis can be caused by large IVs. Therefore, the size of the IV catheter should be adjusted to the conditions of the patient's blood vessel and therapy should be given.

## 5 CONCLUSION

From the description of the research results above, it can be concluded that: site setting and the selection of the IV catheter is crucial in the occurrence of phlebitis; nurse compliance in performing aseptic techniques is lacking in some aspects; there is a significant relationship between the characteristics of infusion and the incidence of phlebitis.

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## The effect of diaphragmatic breathing exercise on pulmonary ventilation function in patients with asthma: A preliminary study

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**ABSTRACT:** Asthma is a chronic inflammatory disease of the respiratory tract, caused by the sensitivity of the trachea and its branching. This study aims to identify the effect of diaphragmatic breathing exercise on pulmonary ventilation function in patients with asthma using the parameter of Peak Expiratory Flow (PEF). This research uses a quasi-experimental method with pretest/post-test and control group design. The selected sample consisted of 20 subjects using random sampling, with ten subjects in the treatment group, and ten control subjects. Data analysis used a *t*-test with  $p < 0.05$ . The results showed that the pretest PEF was 63.2% and it increased post-test to 90.8% in the treatment group. The PEF also increased in the control group, where the PEF pretest was 63.3% and 86.5% in the post-test. This study showed that diaphragmatic breathing exercise has a significant effect on the increase of PEF in asthma patients.

### 1 INTRODUCTION

Asthma is a serious health problem that affects 300 million people of all ages around the world (Prem et al., 2012). Asthma is a chronic inflammatory disease of the respiratory tract that is reversible, characterised by a wide airway narrowing to varying degrees, resulting in an increased response of the trachea and bronchi to various stimuli, with clinical manifestations of cough, chest tightness due to airway obstruction, as well as episodic wheezing (Henneberger et al., 2011). Currently, asthma still shows a high prevalence. Based on world-wide data from the World Health Organization (WHO, 2010), it is estimated there are 300 million people with asthma and the number will grow to 400 million by 2025. According to the results in the Indonesian Ministry of Health (2013) report, the prevalence of asthma in Indonesia was 4.5%, which underwent a 1% increase from the level reported by Indonesian Ministry of Health (2007), while the ranking of asthma incidence in West Sumatra grew from 2.0% (2007) to 2.7% (2013). Asthma is a disease of airway obstruction with symptoms of cough, wheezing, and shortness of breath. Airway constriction in asthma occurs as a result of bronchial obstruction and spasm of smooth muscle in the bronchus, so that the patient has difficulty in breathing. Expiration is always more difficult and longer than inspiration (Henneberger et al., 2011). Inflammation, mucosal membrane oedema, and mucous hypersecretion in the airways cause difficulty for air to pass through (Price & Wilson, 2006).

People with asthma will tend to breathe in high lung volumes. Average asthma sufferers breathe 3–5 times faster than normal. This condition requires hard work by the respiratory muscles, such that asthma sufferers will have breathing difficulty (Price & Wilson, 2006). Signs that can be found during asthma attacks are the use of additional muscles for breathing (sternocleidomastoid and scalene muscles in the neck). Patients will more often use the respiratory muscles of the chest, rather than the abdominal respiratory muscles, so that the diaphragm muscles cannot relax perfectly. The use of chest-breathing muscles and excessive contraction of the diaphragm muscles can affect the ability of the respiratory muscles as a whole, so that the muscles' capacity slowly decreases and the disease gets worse. This condition

causes asthma sufferers to be more frequently and repeatedly treated for increasingly severe complaints, and medically diagnosed with a heavier degree of asthma.

Nurses can perform respiratory therapy to overcome these problems. Respiratory therapy aims to train correct breathing, to flex and strengthen the respiratory muscles, train effective expectoration, and improve circulation.

According to Prem et al. (2012), respiratory therapy in people with asthma is through such means as the Buteyko method, *pranayana* breathing, and diaphragmatic breathing. Diaphragmatic Breathing Exercise (DBE) is performed by maximising the function of the lower lungs so as to increase the capacity of the lungs in breathing, by raising the stomach forward slowly when exhaling (Widarti, 2011). DBE is a respiratory therapy that can increase expiratory air in asthmatics (Ariestianti et al., 2014; Oni et al., 2014), which in turn improves quality of life (Prem et al., 2012).

## 2 METHODS

This research uses a quasi-experimental method with a control group approach and pretest/post-test design. Both control and treatment groups underwent pulmonary ventilation measurements in the form of Peak Expiratory Flow (PEF) measurement (pretest). The treatment group was educated in the use of DBE technique, while the control group was not given the breathing treatment. After the researcher was convinced that the subjects were able to perform DBE correctly, they were required to perform the exercise four times for two minutes every day for one week, in the morning, at noon, in the afternoon, and in the late evening. After the seventh day, post-test PEF measurements were performed.

The entire population of this study consisted of patients with asthma, with a sample size of ten people for each group. The sampling technique used in the research was probability sampling in a simple random sampling. Inclusion criteria were mild and moderate asthma with PEF in the range 60–80%. Participants had to express their willingness to be a research subject, be aged between 18 and 65 years, and not be in exacerbation (PEF < 60%). Both groups received medical drug therapy, which consisted of bronchodilators Ventolin and Aminofilin (aminophylline) infusion at 10 cc 8 hours/500 ml. The tool used to measure pulmonary ventilation function with PEF is a peak flow meter. This research has obtained consent from the Research Ethics Commission at the Faculty of Medicine, University of Andalas. Analysis is made using a paired *t*-test and an independent *t*-test with 95% degree of confidence. Data normality was previously tested and proven normal.

## 3 RESULTS

As shown in Table 1, the distribution of the research subjects is mostly female (80%), in middle adulthood (85%), and has a non-smoking majority (80%).

The results are described in Table 2, which shows that there is a significant difference in the average value of PEF between the treatment and control groups. In the treatment group, the average value of PEF during pretest was 63.2% and went up at the post-test level to 90.9% with  $p < 0.05$ . Meanwhile, the average value of PEF in the control group increased from 63.3% in the pretest to 86.8% in the post-test with  $p < 0.05$ .

The purpose of the independent sample *t*-test in this study was to determine the significance of any difference in PEF values between the treatment group and the control group following administration of the DBE respiratory exercise. The analysis results are shown in Table 3.

Based on Table 3, it can be seen that the average increase in PEF in the treatment group after DBE was 27.5%, with a lower 95% Confidence Interval (CI) value of 3.54 and an upper value of 4.95. In the control group, the average increase in PEF was 23.1%, with a lower 95% CI value of 3.54 and an upper value of 4.96. The result of an independent *t*-test sample in both groups indicated  $p < 0.05$ , which means that DBE has an influence on the increase of peak expiratory flow in asthma patients.

Table 1. Frequency distribution of research subjects of asthma patients.

Variable	Control		Treatment		Total	%
	<i>f</i>	%	<i>f</i>	%		
Age						
Young adult (18–35 years old)	0	0	1	10	1	5
Middle adult (36–60 years old)	10	100	7	70	17	85
Elderly (> 60 years)	0	0	2	20	2	10
Gender						
Male	2	20	2	20	4	20
Female	8	80	8	80	16	80
Smoking history						
Yes	2	20	2	20	10	50
No	8	80	8	80	10	50

Table 2. The mean difference of PEF subjects in the treatment and control groups before and after diaphragmatic breathing exercise.

Variable	Mean (%)	Min–Max	SD	<i>p</i>
Treatment group				
Pretest PEF	63.2	60.6–68.6	2.48	0.000
Post-test PEF	90.8	89.0–91.9	0.76	
Control group				
Pretest PEF	63.3	61.6–65.3	1.24	0.000
Post-test PEF	86.5	85.4–87.9	0.74	

Table 3. Differences between the treatment and control groups in PEF values after administration of diaphragmatic breathing exercise.

Variable	Mean (%)	SD	95% CI (lower–upper)	<i>t</i>	<i>p</i>
Treatment group	27.5	0.7613	3.54–4.95	12.5	0.000
Control group	23.1	0.7499	3.54–4.96	12.5	

4 DISCUSSION

Based on Table 2, it can be seen that the average value of the PEF in the treatment group after administration of DBE has increased from an average pretest value of 63.2% to 90.9% in the post-test. From the analysis, the researcher concluded that the highest post-test PEF scores in the treatment group were achieved at the ages of 36 (91.8%) and 42 (91.9%) years old. According to Antoro (2015), age is the most significant aspect affecting the PEF. Theoretically, muscle strength and respiratory function decrease with age. Changes in the respiratory structure begin early in middle adulthood (Guyton & Hall, 2014). An increase in the lowest PEF values was obtained at age 60 years with a value of 89.6%; this is due to the ageing process, which causes decreased alveoli elasticity, a thickening of the bronchial gland, decreased lung capacity, and an increased amount of loss space (Guyton & Hall, 2014). The decrease in lung capacity is caused by the weakening of the intercostal muscles, thereby reducing movement of the chest wall, and the presence of vertebral osteoporosis, thereby decreasing spinal flexibility and enhancing the degree of kyphosis (Antoro, 2015). This also increases further the anteroposterior diameter of the chest cavity. The diaphragm is commonly flatter and loses its elasticity.

Furthermore, the results of the analysis in this study showed that the male subjects did not show a high increase in PEF value, where the highest value of PEF in the treatment group was 89.8% and the lowest was 89.0%. For males in the control group, the highest PEF value was 86.7% and 85.6% the lowest. This is due to the male subjects' smoking history. Cigarettes can adversely affect both active and passive smokers. A person who inhales cigarette smoke on a prolonged basis can suffer from decreased lung function.

Table 3 indicates that the control group subjects also showed an increase in the average value of the PEF without being given a diaphragmatic breathing exercise. Their average pre-test value of PEF was 63.4% and increased to 86.5% post-test. This increase was because the subjects in the control group also received a bronchodilator drug. High PEF values were achieved by 36-year-old (87.9%) and 42-year-old subjects (87.2%). This condition was caused by changes in breathing structure that began early in middle adulthood, at which age decreasing elasticity of the chest wall begins to occur (Guyton & Hall, 2014).

DBE affects the quality of life of subjects with asthma. It was found that DBE can improve asthma patients' quality of life (Prem et al., 2012). Antoro (2015) also discovered that DBE could increase the PEF of people with asthma. Diaphragmatic breathing optimises abdominal movement and restricts chest movement, so that the abdominal muscles here play an important role in the process of expiration and the breathing exercise may influence the increase of work of the abdominal muscles (Ariestianti et al., 2014).

Based on the results of the research, it was found that both the treatment and control groups experienced an increase in PEF value, but the increase was higher in the treatment group. This is in line with the findings of Salvi et al. (2014), which indicate that DBE has an influence on the increased value of spirometry parameters in asthma patients when the exercise is done regularly for one week. This effect occurs because DBE trains the major muscles of respiration such as the diaphragm muscles to work during inspiration, and abdominal muscles to work during expiration. At the time the respiratory process occurs, the respiratory muscles are the most important component of the respiratory pump and they should work well to produce more effective ventilation (Ariestianti et al., 2014).

According to some experts, DBE aims to train patients to use the diaphragm properly and relax the accessory (respiratory) muscles. The exercise is also aimed at increasing the volume of breath flow, reducing functional residue, improving ventilation, and mobilising mucus secretion during postural drainage (Sharma, 2008). With DBE, the thorax and lung cavities develop during inspiration, and expiratory muscles (abdominal muscles) actively contract to facilitate the expulsion of air (CO<sub>2</sub>) from the thorax cavity. This will lead to increased ventilation, resulting in improved alveoli performance so that gas exchange becomes more effective (Antoro, 2015).

## 5 CONCLUSION

This research has concluded that Diaphragmatic Breathing Exercise (DBE) can increase Peak Expiratory Flow (PEF) in asthma patients. It is suggested that DBE could assist patients in using their diaphragm properly and in relaxing their accessory muscles.

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## The effects of structured education on knowledge, attitude and action of patients with a colostomy

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**ABSTRACT:** The formation of colostomy causes problems; Most of the skin irritation around the colostomy is due to skin contact with impurities. Education on colostomy treatment can prevent this problem. The purpose of this study was to investigate the structured effect of education on colostomy care on knowledge, attitudes, and practices among patients at Padang General Hospital, Indonesia. Data collection was conducted in 2016, using an experimental quasi-study design, with the pretest-posttest single group. A total of 10 ostomates were chosen by purposive sampling. Statistics were performed with paired t-test with  $p < 0.05$ . The result confirmed the structured education had an effect on the knowledge, attitude, and practice of colostomy care. Sharing of knowledge and skills in colostomy care should exist as a routine agenda in preoperative nursing interventions and be provided in structured education programs for patients undergoing colostomy.

### 1 INTRODUCTION

A colostomy is a surgical procedure to create a hole through the abdominal wall into the iliac colon (ascending) as a stool outlet. It can be performed permanently or temporarily depending on the purpose of the operation (Nainggolan & Asrizal, 2013). The most common need for a colostomy is colorectal cancer, which is a malignant disease that attacks the colon (Ignatavicius & Workman, 2010).

Colorectal cancer is the third largest disease in the world (Siegel, et al, 2015), and its incidence is reported highly in developed countries, with 100,000 new ostomates added each year in the US (Davis, & Claudine, 2015). According to Dharmas Hospital in Indonesia, as a National cancer hospital, this cancer is ranked at the third top case in this hospital with a reported 269 new cases. This number is increasing with Indonesian people adopting unhealthy lifestyles. The growing number of colorectal cancer patients will, in turn, increase the number of colostomy sufferers (Data & Information Center, 2015).

The formation of a colostomy will cause many problems to the sufferers, physically, mentally, emotionally, socially, and economically (Panusur, & Nurhidayah, 2007). Some researchers found problems such as: skin irritation mainly from the leakage of urine or faeces; infection; and pyoderma gangrenosum; use of colostomy tools and accessories; diet; stoma issues; psychological issues; and how to resume a normal life. It was found that these problems affected the patient's life in at least the first five years after having a colostomy fitted (Burch, 2013; Herlufsen et al., 2006; Jordan & Cristian, 2013). Those problems existed due to lack of knowledge and not seeking the help of health professional.

Colostomy patients should be taught how to manage their colostomy after the preoperative period so that the patient is able to perform a colostomy treatment independently once they are out of hospital (Burch, 2013). Patient education is a part of nursing care and provides an integrated health education centered on a patient's problems (Potter, & Perry, 2013). Educating patients can be undertaken in a structured and informal way. Nevertheless, structured education, according to the National Institute for Health and

Care Excellence (NICE, 2003), should be a planned and comprehensively rated education programme, flexible in content, responsive to an individual's clinical and psychological needs, and tailored to the education and cultural background of the patient. According to Kadam and Shinde (2014), the provision of structured education improves the knowledge and attitude of caregivers in performing colostomy care, while Danielson and Rosenberg (2014) stated, it could improve quality of life. The provision of education to patients will increase their responsibility for self-care and be able to carry out ongoing home care independently (Potter, & Perry, 2013). From the preliminary survey, four patients received only verbal, brief, and unstructured information about colostomy care. Stoma pouch and skin care were taught only when nurses performed surgical wound care and replaced a patient's colostomy bag. Patients did not know when and how to change pockets, empty the right colostomy bag, care for the skin around the stoma to prevent irritation, what to do in case of irritation, and that certain foods could affect the elimination. Three people felt embarrassed and uncomfortable with having a colostomy fitted, the odour, and the discomfort felt. Based on these problems, further exploration and investigation on the effect of structured education on the knowledge, attitude, and actions of patients in the care of colostomies was deemed necessary.

## 2 METHOD

This was a quasi-experimental research involving one group with pre-test post-test design, giving treatment to the subjects, measuring and then analysing results of the treatment. The population were 72 ostomates being treated in Padang General Hospital during a least the last three months of 2016. Ten population samples were selected using a purposive sampling technique for the following criteria: temporary/permanent colostomy patients;; new ostomates;; post-op colostomy (four days or more);; and cooperative awareness.

The instruments consisted of three questionnaires and observation sheets. Questionnaire A elicited the characteristics of the respondents. Questionnaire B was used to assess patient knowledge with the Guttman scale., while questionnaire C was used to assess the patient's attitude with the Likert Scale. The results of the univariate data are displayed as a frequency distribution and percentage table. Bivariate analysis was used to test the relationship between the two variables studied. and data was processed by a computer program variable. The first data normality test was performed with a Shapiro-Wilk test, and then a t-paired test was used to test the hypothesis.

## 3 RESULTS

Prior to the intervention, a pre-test of the patients' knowledge and attitude on colostomy care using questionnaires B and C, was undertaken. Educational interventions were held for 30 minutes each session in the patient's room by using a booklet, counselling, and demonstration. After the intervention, a post-test on the same aspects was completed and evaluated.

In Table 1, most of respondents (70%) were  $\geq 40$  years old, 4 persons were elementary and middle school educated; 40% were housewives., 90% had a permanent colostomy fitted, and 80% had never received education on their stoma. More than half of the respondents (60%) had skin irritation around the colostomy site.

Table 2 shows that prior to the intervention, most respondents (60%) had low knowledge level and the intervention increased their knowledge so that 80% of them knew more. It was also found that 60% had negative attitudes before educational intervention, while their attitudes became 70% positive, after being given education (post-intervention). Lastly, more than half of respondents (60%) had been able to take good care of their colostomy treatment after being educated.

Table 1. Frequency distribution results based on respondent's' characteristics (n = 10).

No.	Characteristics	Criteria	f	%
1	Age (years)	≥40	7	70
		<40	3	30
2	Gender	Male	4	40
		Female	6	60
3	Education	Elementary	4	40
		Middle school	4	40
		High school	1	10
		University	1	10
4	Working status	Farmer	3	30
		NGO	3	30
		Housewife	4	40
5	Economic level	Low	1	10
		Moderate-low	7	70
		Moderate	11	10
		High		10
6	Education on colostomy	Good	2	20
		Bad	8	80
7	Colostomy type	Permanent	9	90
		Temporary	1	10
8	Skin irritation	Yes	6	60
		No	4	40

Note: NGO = Non Government Officer.

Table 2. Frequency distribution based on respondents' knowledge, attitude and action on colostomy care (before and after), (n = 10).

Item	Before		After	
	f	%	f	%
Knowledge				
High	2	20	8	80
Moderate	2	20	2	20
Low	6	60	0	0
Attitude				
Positive	4	40	7	70
Negative	6	60	3	30
Action	—	—		
Good			6	60
Not			4	40

Table 3. Effect of knowledge of respondents before and after structured education about colostomy treatment.

Knowledge	n	Mean	Increase	SD	p value
Before	10	64,00	23,00	14,9	0,000
After	10	87,00		8,9	

Table 3 shows that  $p = 0,000$  ( $p < 0.05$ ), then there is the effect of structured education on the patient's knowledge in colostomy care. Table 4 shows that the value of  $p = 0.001$  ( $p < 0.05$ ) confirming the hypothesis having an effect on the structured education on the patient's attitude in colostomy care is real.

Table 4. Effect of respondents' attitudes before and after structured education about colostomy treatment.

Attitude	n	Mean rank	Increase	SD	p value
Before	10	20,52	4,90	2,22	0,001
After	10	5,4		4,06	

#### 4 DISCUSSION

The results showed that the low level of knowledge of respondents, due to lack of information about colostomy treatment, where 60% of respondents have a low level of formal education. Education affects the learning process. The education provided will increase the acceptance of ostomates' responsibilities in self-care as well as enable them to carry out ongoing home—care independently (Potter, & Perry, 2013). After a structured education of colostomy care was held, most patients (80%) had a good knowledge and only a small proportion (20%) had sufficient knowledge. The statistical hypothesis test results confirmed the existence of the structured educational effect on changes in patient knowledge.

Health education is one of the processes to improve one's knowledge by obtaining more information from other people, printed mass media, and electronic sources, such as newspapers, leaflets, magazines, television and the radio (Mahdali, et al., 2013). Alenezi and Mansour (2016) also stated that the provision of structured education will improve patient knowledge in stoma care and reduce the incidence of peristomal skin complications when compared to non-educated patients. An interactive process that encourages the learning process is important, and learning is an effort to add new knowledge, attitudes and skills through strengthening certain practices and experiences (Widiastuti, 2013). In this study, a structured approach was taken in the provision of individual counselling and was undertaken for 30 minutes in two meetings using a booklet.; this was found to be very helpful and effective in delivering teaching materials and enhancing individual knowledge.

In this study, each respondent was given a booklet that could be taken home, so they are expected to understand and learn more at home. A contact number that could be used by the patient if they had any questions, was also given. The structured education was given through counselling and demonstrating the steps in colostomy care. The correct procedure of replacing the colostomy bag properly was demonstrated and the patient was then required to re-demonstrate what they had learnt. Moreover, this study discovered that there was no significant difference in attitudinal values between patients with permanent and temporary colostomies. This was due to the lack of certainty that temporary colostomy patients experienced. Hong, et al. (2014) also stated that there was no significant average difference in attitudinal values between patients with permanent and temporary colostomies, but there was little apparent difference in their assessment of attitudes towards worsening body image and lower self-esteem.

Attitude is the judgement (possibly the opinion) of a person against the stimulus or object. Once someone knows the stimulus and the object, the next process is to assess any change in the judgement against the stimulus/object (Ignatavicius, & Workman, 2010). A patient's attitude in this study indicated his/her knowledge of colostomy and its treatment. If a person's knowledge is not good, the resulting attitudes tend to be negative. This is simply because knowledge is one factor in the formation of an attitude. After respondents were given structured education, there was a positive attitude improvement from only 4 people (40%) to 7 people (70%). Improved attitudes in this study occurred because patients have gained knowledge through the provision of structured education about colostomy care. Moreover, the paired t-test result of  $p = 0,001$  ( $p < 0,05$ ) confirmed the influence of structured education on a respondents' change of attitude. The results of this study were similar to those of Kadam & Shinde (2014) who found an increase from 30% with a positive attitude to 70% having a strong positive attitude, after being given structured education on colostomy care. It can be

concluded from the results and discussion that postoperative education intervention conducted for two days for the duration of only 30 minutes in each meeting, had not been able to significantly improve respondents' skills/ability in colostomy care.

#### 4 CONCLUSION

It can be concluded that: there was a significant increase in respondents' knowledge before and after given structured colostomy care education; there was a significant improvement in respondents' attitudes before and after being given structured colostomy care education; patients had the ability to perform colostomy care after structured education; and structured education affected the patients' knowledge, attitude, and actions in the care of colostomy.

Hospitals need to include patient education into routine activities in every inpatient unit and to create a counselling division in each unit of care. Nevertheless, further research is needed to explore further actions for patients and their families in treating cancer patients.

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## The relationship between admission factors and first-semester grade point average in Indonesian nursing students

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**ABSTRACT:** The purpose of this study was to determine what experience factors (region of origin and attendance at a pre-nursing course), attribute factors (gender) and academic metric factors (admission exam scores and type of high school) are associated with the first-semester Grade Point Average (GPA) of first-year nursing students enrolled in a baccalaureate nursing programme in Indonesia, using an adapted holistic admission model. A descriptive correlation design was used. Multivariate linear regression was used to determine the relationship between factors and first-semester GPA. A significant relationship ( $p < 0.05$ ) was found between experience factors, attribute factors and academic metric factors and first-semester GPA. However, the study variables only accounted for 28% of the variance in GPA. Additional research is needed to identify other factors, guided by the adapted holistic admission model, that may also have a relationship with GPA.

### 1 INTRODUCTION

As Indonesia is the fourth most populous country in the world with 252.8 million people in 2014 (World Bank Group, 2015) and has a high demand for health care services, primarily supported by nurses, it is important that nursing programmes are preparing graduates to meet the demand in terms of quantity and quality of graduates. Holistic admissions review is a growing movement in healthcare education, including nursing, as an individualised way of assessing potential student's capabilities to contribute value to a healthcare profession that includes a balanced consideration of various factors (American Association of Medical Colleges, 2013; Scott & Zerwic, 2015). Scott and Zerwic (2015) described the adaptation of the medical model of holistic admission for use in nursing to increase the diversity among students and included factors of experiences (i.e. experiences in life, education, leadership and cultural diversity), attributes (i.e. demographics, maturity and goals) and academic metrics (i.e. grades and pre-admission to healthcare programme test scores). According to the model, balanced consideration is given to these factors, so that the emphasis is on the contribution the applicant will make to the nursing profession (Scott & Zerwic, 2015).

As holistic admissions review is implemented in nursing programmes, it will be important that academic success is monitored (Glazer et al., 2016). A strong predictor of graduation is a student's academic achievement, which includes grades (American Council on Education, 2016). However, in nursing, there is a lack of data on which student factors best predict future success (Glazer et al., 2016). It is important to determine what factors may be related to academic achievement of nursing students. The adapted holistic admission model (Scott & Zerwic, 2015) is useful for guiding the selection of factors that may affect Grade Point Average (GPA).

The purpose of this study was to determine what experience factors (region of origin and attendance at a pre-nursing course), attribute factors (gender) and academic metric factors

(admission exam scores and type of high school) are associated with the first-semester GPA of nursing students enrolled in a baccalaureate programme in Indonesia. First-semester GPA has been associated with success in nursing programmes (Newton & Moore, 2009).

## 2 METHOD

### 2.1 *Study design and sample*

A descriptive correlation design using secondary data analysis was used. The data set was from academic and admission data that were collected in a database of all accepted first-year nursing students at an Indonesian university between August and December 2016. A power analysis was conducted to determine the minimum sample size needed (Green, 1991). With 12 variables, a medium effect size, alpha level set at 0.05 and power set at 0.80, the minimum sample size was 127. The size of the data set was 510, which exceeded minimum sample size.

### 2.2 *Ethical consideration*

The privacy of students was protected using a de-identified database that did not contain any student identifying information. All data in the de-identified database was kept confidential and stored on secure servers accessed from password-protected computers. Approval for the study was from the Mochtar Riady Institute of Nanotechnology Ethics Committee in Indonesia and from the University of Kansas Medical Centre Human Research Protection Program in the US.

### 2.3 *Data collection and analysis*

The variables of interest for this study were first-semester GPA, the experience factors of region of origin and attendance at a pre-nursing course, the attribute factor of gender, and the academic metric factors of admission exam scores and type of high school. A previous study has shown a relationship between GPA in the first semester and completion of the nursing study programme (Newton & Moore, 2009). Bacon and Bean (2006) determined that the reliability of first-year GPA with all courses was 0.84 and by the end of the fourth year, it had increased to 0.94. They suggest that GPA is a reliable indicator to measure academic performance of students.

The variables of region of origin and attendance at a pre-nursing course were chosen as experience factors for this study. Region of origin was used to represent various experiences in culture and life and was defined as the region in Indonesia where the student resided before coming to university and was divided into five categories (See Table 1). The variable attendance at a pre-nursing course was defined as attendance, by invitation, to come before the start of the first semester for intense instruction in life skills, basic computer and math skills, and introduction to English. A previous study found a weak association with region of origin/ethnicity and GPA in nursing students in New Zealand (Shulruf et al., 2011). However, little is known about the relationship between experiences and GPA for Indonesian nursing students.

The variable of gender, defined by the World Health Organization in 2011 as socially constructed characteristics of women and men, is an attribute factor. Previous studies have not found a relationship between gender and GPA (Shulruf et al., 2011). It is unknown what the relationship may be in nursing students in Indonesia.

Academic metrics included type of high school and scores on four admission exams. The type of high school was defined as the classification of the high school programme the student attended. The types of high schools were divided into three categories (See Table 1). The exams for math, English and Indonesian were developed by faculty members that taught those subjects. No reliability and validity studies have been conducted. The math exam had a range of 0–30 and tested basic math concepts. The English exam had a range of 0–50 and tested English reading ability and grammar. The Indonesian exam had a range of 0–40 and tested Indonesian reading ability and grammar. The logic patterns exam is the language-free version of Raven's

Table 1. Characteristics of the sample ( $N = 506$ ).

Variable	Mean	Standard deviation
Admission exam scores (possible range)		
Math admission exam score (0–30)	10.17	3.91
English admission exam score (0–50)	19.93	5.36
Indonesian admission exam score (0–40)	17.23	3.60
APM admission exam score (0–36)	21.55	3.55
GPA (0.00–4.00)	3.03	0.25
	<i>n</i>	%
Region of origin		
Sumatra Island (reference group)	161	31.8
Java and Bali Islands	106	20.9
Eastern Islands	104	20.6
Sulawesi Island	94	18.6
Kalimantan Island	41	8.1
Attendance at pre-nursing course		
No (reference group)	394	77.9
Yes	112	22.1
Gender		
Female (reference group)	401	79.2
Male	105	20.8
Type of high school		
Science high school (reference group)	402	79.4
Social science vocational or high school	60	11.9
Health/science vocational school	44	8.7

Advanced Progressive Matrices (APM) licensed by the University of Indonesia. The international technical manual (Raven, 2011) states that the reliability of the APM for studies done in the United States, as measured by split-half internal consistency, was 0.85, indicating good reliability because it is greater than 0.80 (Polit & Beck, 2017). The manual also discusses evidence of content, convergent and criterion validity and recommends that local validity studies be completed. Nursing programme admission exam scores have been associated with the GPA of first-year nursing students (Shulruf et al., 2011; Underwood et al., 2013).

Data were analysed using SPSS version 21 statistical software. Descriptive statistical analysis included means and standard deviations for continuous variables, and frequency distributions and percentages for categorical variables. Multivariate linear regression was used to determine the relationship between the variables and first-semester GPA. The data were first explored for missing data and whether they met the assumptions of linearity, normality, non-multicollinearity, homoscedasticity and independence. Four of the participants had missing data related to type of high school, a missing data rate of 0.8%. Since the missing data was less than 1%, listwise deletion was used and it is acknowledged that there is a small potential for bias (Parent, 2013). After listwise deletion, the remaining data ( $N = 506$ ) were examined for meeting the assumptions of multivariate linear regression and all assumptions were met.

### 3 RESULTS

The characteristics of the final sample of 506 participants are displayed in Table 1. The mean GPA of the sample was 3.03. Most of the participants were from the island of Sumatra and did not attend the pre-nursing course. There were 401 females (79.2%) and 105 males (20.8%). The means of the admission exams were: math 10.17; English 19.93; Indonesian 17.23; APM 21.55. Most of the participants attended a science-focused high school.

Table 2. Regression table.

Variable	B	SE(B)	95% CI for B		<i>t</i>	Sig.	$\beta$
			Lower	Upper			
Gender	-0.07	0.02	-0.12	-0.03	-3.13	0.002	-0.12
Attendance at pre-nursing course	-0.01	0.03	-0.05	0.04	-0.22	0.827	-0.01
Java and Bali Islands (dummy variable)	-0.06	0.03	-0.11	-0.00	-2.08	0.038	-0.10
Kalimantan Island (dummy variable)	-0.01	0.04	-0.09	0.06	-0.39	0.701	-0.02
Sulawesi Island (dummy variable)	-0.03	0.03	-0.09	0.02	-1.19	0.236	-0.05
Eastern Islands (dummy variable)	-0.03	0.03	-0.08	0.03	-0.95	0.345	-0.04
English admission exam score	0.01	0.00	0.01	0.02	6.09	0.000	0.27
Math admission exam score	0.01	0.00	0.00	0.01	2.28	0.023	0.10
Indonesian admission exam score	0.01	0.00	0.01	0.02	5.04	0.000	0.21
APM admission exam score	0.01	0.00	0.00	0.01	3.27	0.001	0.13
Health/science vocational school (dummy variable)	-0.02	0.04	-0.10	0.05	-0.67	0.503	-0.03
Social studies high school or vocational school (dummy variable)	-0.10	0.03	-0.16	-0.04	-3.20	0.001	-0.13

Note: SE = Standard Error; CI = Confidence Interval; Sig. = *t*-test significance.

Blockwise multivariate linear regression was done to determine the relationship between GPA and the independent variables. This study performed a three-block model (Model 1) and a two-block model (Model 2). Model 1 blocked the variables in three steps: (1) attribute factors; (2) experience factors; (3) academic metric factors. Model 2 had two steps: (1) attribute and experience factors; (2) academic metric factors. Only 2% of the variance was explained by attribute factors in Model 1. Thus, Model 2, including both attribute and experience factors in the first block, was chosen and reported in this study. The multiple correlation coefficient *R* was 0.53 for the final model. The *R*<sup>2</sup> was 0.28, indicating that about 28% of the variance in GPA was accounted for by all independent variables, and only 5% of the variance was explained by attribute and experience factors. This linear combination of independent variables was significantly associated with GPA,  $F(6, 493) = 26.62, p < 0.001$ .

Based on analysis of beta coefficients, several independent variables were associated with GPA (see Table 2). When individual variables using standardised beta scores were examined, the score on English admission exam explained the most variance in GPA; followed by the score on Indonesian admission exam; score on APM admission exam; type of high school, social science focused vocational or high school when compared to science-focused high school; gender, male when compared to female; score on the math admission exam; and region of origin, islands of Java and Bali when compared to island of Sumatra. There was no significant relationship between attendance at the pre-nursing course and GPA.

Controlling for all the other variables, when each of the admission exam scores was increased by one point, the GPA increased by 0.01. If the student attended a social science focused vocational or high school, the GPA decreased by 0.10, compared to students that attended a science high school. Male students had a 0.07 lower GPA than female students. Students from the islands of Java and Bali had a 0.06 lower GPA than students from the island of Sumatra.

#### 4 DISCUSSION

This study examined what experience factors (region of origin and attendance at pre-nursing course), attribute factors (gender) and academic metric factors (admission exam scores and type of high school) were associated with the first-semester GPA of first-year nursing students in a baccalaureate nursing programme in Indonesia. A significant relationship ( $p < .05$ ) was found between region of origin, gender, admission exam scores, type of high school and first-semester

GPA. No significant relationship was found with attendance at the pre-nursing course. This may be because the pre-nursing course provided additional learning and support before the first semester and assisted in preparing those students for the rigours of the nursing programme.

The findings of a relationship between region of origin and GPA is similar to previous findings (Shulruf et al., 2011). It was surprising that students from the islands of Java and Bali had significantly lower GPAs, as those islands tend to have stronger high school programmes. Perhaps the region of origin needs to be divided into more categories to better explore association with GPA. Previous studies have also found a relationship between admission exam scores and GPA (Shulruf et al., 2011; Underwood et al., 2013). The findings in this study of a relationship between gender and GPA was not found in previous studies (Shulruf et al., 2011). Students that did not attend a science-focused high school had a lower GPA at the end of the first semester.

The admission exam scores for English and Indonesian had the most influence on first-semester GPA. This may be because students were enrolled in a General English course in the first semester and those that scored higher on the admission English exam may also have achieved a higher grade in the General English course, resulting in a higher GPA. It may also be that those that scored higher on the Indonesian admission exam have a better Indonesian reading and writing ability that influenced their general performance in all courses, resulting in a higher GPA.

## 5 CONCLUSIONS

This study adds to the body of knowledge related to the holistic admission model. Factors of experience, attributes and academic metrics were found to have an association with first-semester GPA. The findings that male students, students from a social science vocational or high school, and students from the islands of Java or Bali had lower GPAs have meaningful implications in identifying students at possible high-risk of a GPA below 2.75. As these students may be at risk of a lower GPA and being unsuccessful in the nursing programme, student support interventions, such as academic counselling, study skills workshops, writing resources, support groups and so on, could be applied to assist them during the first semester and throughout the nursing programme. Identifying high-risk students early and implementing support interventions may assist the students to improve their GPA and successfully complete the nursing programme.

As the variables in this study only explained 28% of the total variance in GPA, additional research is needed to determine what other variables are associated with first-semester GPA in first-year nursing students (i.e. interviews, psychology test results, support services, study habits, etc.). The variables may be a combination of admission factors (i.e. experience, attributes and academic metrics) and factors that occur during the first semester (i.e. tutoring, transition to university, study habits). Identifying such factors may aid in early identification of students that are at high-risk of not completing the nursing programme.

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## A systematic review: Implementation of reflective learning in nursing practice

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**ABSTRACT:** The aim of this study was to identify the use and effectiveness of reflective learning in nursing practice. This study used a systematic review of qualitative studies of reflective learning in nursing practice. Articles were searched for and identified from three databases (ProQuest, Cengage and EBSCO). Eleven studies were selected, with the total participants being 24 Register Nursing students, 315 nursing students, and 11 tutors in nursing. The methods used in these studies were interviews, reflective writing, focus group discussion and a combination of several methods. The three major themes were identified as the advantage of using reflective learning, barriers to reflection and the improvement due to the use of reflection in nursing education and nursing practice. The use of reflective learning in education and nursing practice is very effective in improving the quality of nursing students. All stakeholders would benefit from an awareness of the value of reflective learning, which can be implemented in patient care.

**Keywords:** Education, Nursing, Reflective learning

### 1 INTRODUCTION

The aim of nursing education is to prepare nursing students to have an appreciation and concern for human dignity during their duties in clinical service. Concern and caring are developed in order to enhance the ability of future nurses in rendering service, not only for the community, but also for the individual patients under their supervision. Each individual will be aware of the benefits of using reflective learning. Reflective learning is a learning process that requires a great deal of time and practice. It is a dynamic process that involves thinking through the issues ourselves, asking questions and seeking out related information in order to gain understanding. Reflection was found to develop students' self-awareness and self-confidence (Smith & Jack, 2005). Reflective learning has an advantage for the students' learning. Glaze (2002) discovered that critical reflection improved students' learning through a process of perspective transformation.

### 2 METHOD

The goal is to systematically review and synthesise the evidence from all of the published qualitative studies on reflective learning in supporting nursing practice. This integration of information from various qualitative studies may present a series of themes for the better understanding of the usage and effectiveness of reflective learning in nursing practice.

## 2.1 Research strategy

The literature is presented in a systematic review. The ProQuest, EBSCO, and Cengage libraries were searched from 1st January 2014 through to 31th March 2016, with the use of the terms reflective learning, reflective practice or reflective thinking, reflective writing or reflective journals, and nursing practice. These keywords were searched independently and in combination. In this first step of the search process, 177 articles were identified.

## 2.2 Inclusion and exclusion criteria

Published articles that met the following criteria were included: the study should be in English; the participants are nursing students who are still studying or have recently graduated, Register Nurse (a nurse who has graduated from school nursing and has passed a national licensing exam) and the tutors. The studies must utilise qualitative methods on the research topic: reflective learning or reflection as a method of research, which includes reflective practice, reflective thinking, reflective writing and reflective journals. If duplicated studies were identified, only the most recent study was included. Only studies published as full text articles were involved in the review. Studies that were published only in abstract form were excluded.

## 2.3 Data extraction

The following general information was extracted from each article: language, author, year of publication, full text available, detail about the subject, and the method. The result of the systematic literature search is show in the following Figure 1:

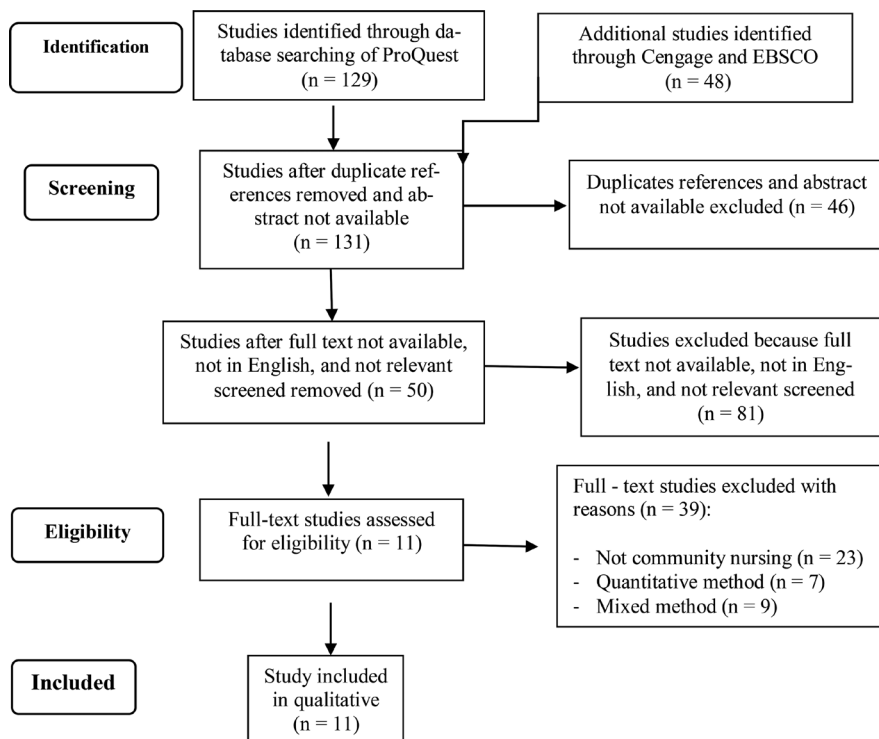


Figure 1. Results of the systematic literature search (Mother et al., 2009).

## 2.4 Data analysis

We included qualitative studies that used interviews, focus groups or observation on the use of reflective learning, and reflective writing in nursing practice. We excluded studies if they had duplicates references and the abstract was not available. Non-English articles were excluded in order to prevent a cultural and linguistic bias in translations. We excluded studies if they used mixed methods in their studies or reported only quantitative data. Studies that did not elicit data from the practice of nursing students within the scope of the hospital were also excluded.

## 3 RESULT

Out of the 50 studies that were examined, 11 studies meet the inclusion criteria. The variables used for the study design was reflective learning, including reflective thinking, reflective writing, reflective case study, reflective interview, reflective action and reflective experiences. The participants involved in the 11 studies consisted of 24 register nurse students, 315 nursing students, and 11 tutors in nursing. The purposes of most of the studies was to explore the perception and the effectiveness of reflective learning in enhancing the learning experience of nursing students. The same statement was also expressed by ter Maten-Speksnijder, et al. (2012) about the purpose of their study, which was to describe learning opportunities in the reflective case study, was used as an educational tool to inform future curriculum development. The other purpose of the studies was to explore how different didactic strategies support nursing students' experiences of learning during the first year of a reconstructed nursing curriculum (Westin et al., 2015; Willemse, 2015; Lister, 2012). Williams and Burke (2015) have a few objectives in their study: to analyse nursing students' stories and to understand how students develop a sense of being a nurse while pursuing a nursing degree. The use of reflective learning as a method in studies, could obtain data with regards to nurses' attitudes and goals in carrying out their profession. Many methods are used in reflective learning, such as reflective thinking, reflective writing, reflective case study, reflective experience, and reflective action.

### 3.1 Advantage of using reflective learning

The first theme is the advantage of using reflective learning. Some participants in the study stated that reflective learning increased their motivation in taking nursing education. The nursing students stated that they became more courageous in various situations. They trusted their ability and developed increased self-confidence. The students also believed in the importance of challenging their abilities and being themselves (Westin et al., 2015). The awareness of caring for the whole patient increased with the use of reflective learning (Westin et al., 2015; Williams & Burke, 2015). Several participants included the word "awesome"- as they reflected on learning experiences that caused them to "feel like a nurse" (Lister, 2012, p.111). Students have reflective ability (Silvia et al., 2012; ter Maten-Speksnijder et al., 2012), and student preconceptions of reflection, based on previous experience, shaped their perception of the benefits of the use of reflection in their current course. All students and tutors believed that reflection improved nursing practice and one tutor included benefits to future practice (Stirling, 2015).

The discussions suggest that reflective learning and the use of stories about the experience of giving and receiving care can contribute to the development of the knowledge, skills and confidence that enable student nurses to provide compassionate relationship-centred care within the practice (Adamson & Dewar, 2015). Positive learning experiences included access to a variety of clinical cases and information, the creation of a learning platform and the availability of educators and peers to answer questions (Willemse, 2015). Reflective experience provides benefits to participants, as mainly described incidents they had experienced; for example, patient data, doctor action, nurse action, treatment, communication, experience, and outcome. This experience will increase the confidence of students nurses (De Swardt et al., 2012).

### 3.2 *Barriers to reflection*

The second theme was barriers to reflection. Participants described faculty personalities and interactions as having very personal and significant impacts on their learning. It was reported that negative experiences were reported during reflective sessions due to the students taking advantage of each other and verbally the faculty members who did not like it if the student spoke frankly. This would result in a “tense classroom”, which “made it hard to concentrate and learn” (Lister, 2012, p.102). All students and tutors thought that previous negative experiences of reflection impacted upon the students’ perception of reflection. Too much reflection in post registered nursing education was reported to be burdensome (Stirling, 2015). In addition, it was also noted that study participants found themselves in a place full of disputes, which in some cases threatened the relationship with the student/instructor. Furthermore, reflective writing that was written by the participants, which described the instability in the clinical setting, was perceived as a source of stress for the participants and seemed to threaten the student-instructor relationship by decreasing tolerance and producing unfair expectations (Shahsavari et al., 2013).

### 3.3 *Improvements in the use of reflection in nursing education and nursing practice*

The last theme is the improvement in the use of reflection in nursing education and nursing practice. Stirling (2015) argued in his research that all students believed that reflection would be more beneficial if the students were given time to reflect on something they identified as important. Moreover, all students and tutors expressed the need to explore different models of reflection in order to maximise effectiveness. Reflective learning helps students to gain insights into nursing and increase one’s self-awareness (Westin et al., 2015). Some participants ask students with extensive health care experience to note problems with their earlier experiences that they did not previously consider. They discovered many ways to care for patients and that they needed to utilise new strategies and knowledge for each unique situation. Furthermore, the students reported that a clinical placement early in the first semester was valuable for their learning. They became involved in real patient situations and had opportunities to care for patients in the early stages of the programme. The participants expressed reflective experience through focus group discussion (Lister, 2012). Clinical experiences also helped to develop a professional identity. Some participants expressed their awareness of growth while they were in school. Studies conducted by Willemse (2015), used electronic reflections. As a result, participants reflected that the electronic reflection discussions created an online discussion trail that allowed them to go back to information and use it in preparation for assessments.

## 4 DISCUSSION

Learning is equivalent to “finding meaning” and always implies schematisation and embodies new experiences. Learning implies construction and the approval of an interpretation that determines action (Silvia et al., 2012). The reflective practice could be described as a deliberate cognitive and affective exploration of experiences with the purpose of learning from experiences (Chapman et al., 2009). Different methods can be used for reflection, for example, reflective diaries, journals or writing, reflective group discussions, reflective experience and guided reflection. Reflective learning is the process of internally examining and exploring an issue of concern, triggered by an experience, which creates and clarifies meaning in terms of self, and which results in a changed conceptual perspective (Boyd & Fales, 1983). This process is central to understanding the experiential learning process. Reflective learning is a practice that facilitates the exploration, examination, and understanding of feeling, thinking and learning. It is a thoughtful consideration of academic material, personal experiences, and interpersonal relationships. It is a form of internal inquiry that extends the relevance of theory and deepens their understanding of the practice of everyday life and work. It is necessary, for education and nursing practice, to assess and evaluate all their quality of

care. The most important aspect of reflective learning is a process in which people can learn about themselves. Furthermore, students knew where they made mistakes and could understand why the error occurred; therefore the same mistake will not be repeated. They discover their abilities and improve their self-confidence. Moreover, several studies also showed an increase in the quality of graduated students. Students will learn to recognise themselves, their abilities and their strengths, and will recognise senior habits and patterns of work in which they participate.

## 5 CONCLUSION

In conclusion, the use of reflective learning in education and nursing practice is very effective in improving the quality of nursing students. It is recommended that reflective learning should be included as a teaching and learning strategy method to enhance theory and practice integration in nursing. All role players, such as nurse educators, professional nurses, mentors, and preceptors, would benefit from an awareness of the value of reflective learning, not only for patient care but also for nurses' self-development.

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## Determinants of nursing licensure examination performance: A literature review

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**ABSTRACT:** Implementation of the Indonesian Nursing National Competency Test is facing several challenges. These issues have been a significant concern for every nursing school. The purpose of this study was to systematically review the existing literature to identify determinants or contributing factors in NLE (National Licensure Examination) performance. A multiple database search was used and out of 1,735 articles, 19 articles were reviewed which met both inclusion and exclusion criteria. The systematic review yielded two emerging themes in determining contributing factors to NLE performance namely: academic factors (cumulative grade point average, science subject scores, nursing subjects scores) and non-academic factors. Understanding the contributing factors to NLE performance is important not only for the nursing institutions but also for students and the faculty. The findings of this study provide deeper insights; contributing to the repository of knowledge of determinant or risk factors as bases for programme development for the success in the NLE performance.

### 1 INTRODUCTION

The implementation of the Indonesian Nursing National Competency Test (INNCT) has been facing several challenges, such as facilities and technical problems (internet connection, electricity, etc.), pass rate, and pass grade. The pass rate of period I/2015 was 45.45% and period II/2015 was 53.61% (Ristekdikti, 2016). These issues have been a significant concern for every nursing school, because they reflect the quality of the teaching process in the schools. There have been many studies conducted into National Licensure Examination (NLE) performance. This study aims to explore the determinants of NLE performance. The results could serve as database in preparing nurse graduates to perform better on the NLE.

### 2 METHOD

This systematic review study followed the Preferred Reporting Items for Systematic review and Meta-Analysis (PRISMA) protocol (See Figure 1). This involved conducting a systematic search of the literature using full electronic databases, including ProQuest®, OVID®, EBSCO®, JSTOR and PubMed® and a manual search of literature that appeared in the period from 2006 to March 2017. Inclusion criteria for this study included: research articles were written only in English, written within a ten-year period (2006–March 2017), peer-reviewed, has free full text, is published in a scholarly journal, and employed quantitative studies. The risks of bias include: the various published sources; the selection process used which consist of only five databases; and heterogeneity of the licensure examination or methods of the studies.

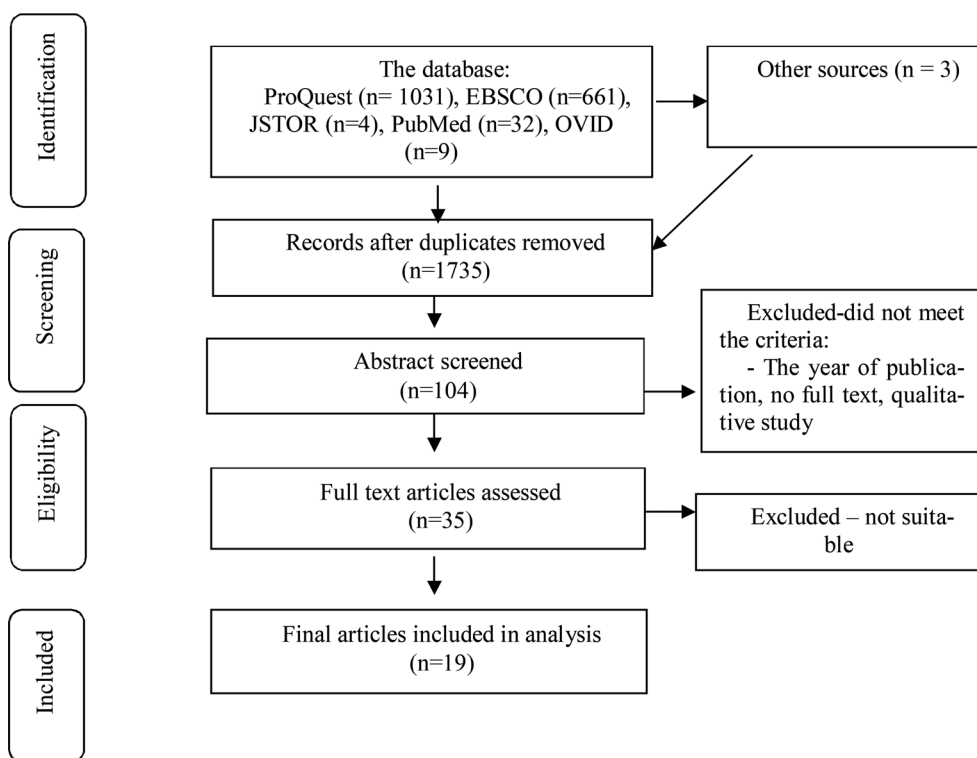


Figure 1. Flow diagram of reviewing process.

### 3 RESULTS

#### 3.1 Academic factors

##### *Cumulative Grade Point Average (CGPA)*

The CGPA was considered as a significant predictor for NLE performance in several studies. Amankwaa et al. (2015) stressed that there was a strong association between CGPA and the NLE performance. Penprase et al. (2013) believed that overall GPA was increasing the probability of the pass rate. The higher the GPA, the higher is the possibility of passing the NCLEX-RN (National Council Licensure Examination for Registered Nurses) examination. Participants who were successful on the licensure examination at the first attempt had a 0.3 higher mean nursing GPA than those students who were unsuccessful (Gilmore, 2008). GPA demonstrated moderate positive correlations with NCLEX-RN success (Foley, 2016). The CGPA was found to have a significant relationship to, and could be predictive of, first-time success on the NCLEX-RN for graduates of the nursing programme (Reeve, 2014). A significant relationship was identified between the two variables ( $r = 0.180$ ,  $p < 0.01$ ) s GPA and the NCLEX-RN passing rate (Outlaw et al., 2013). Simon et al. (2013) argued that the GPA is a predictor of NLE score. In contrast, Ukpabi (2008) contended that there was no significant correlation between NCLEX-RN and GPA ( $p = 0.676$ ).

#### 3.2 Science subject scores

Breckenridge et al. (2012) stated that the best single predictor of NCLEX-RN passing rate was the science GPA, followed by the undergraduate GPA prior to the nursing major. Simon et al. (2013) supported that student performances in biology and chemistry courses are linearly associated with NLN (National League for Nursing)-readiness scores. Shirrell,

(2008) believed that the critical thinking score is predictive of success on the NCLEX-RN ( $F = 7.987$ ,  $p = 0.0001$ ). Romeo (2013) maintained that the assessment test composite score ( $p = 0.013$ ) and the critical thinking composite score ( $p = 0.008$ ) were statistically significant as predictors of passing the NCLEX-RN for the first time. However, different results were found by McGahee et al., (2010) who explained there was no significant correlation between several variables such as science GPA, fundamentals of nursing, health assessment and pathophysiology. But, there were significant interactions that indicated that certain combined variables such as between the science GPA: fundamentals ( $p = 0.002$ ), science GPA: health assessment ( $p = 0.04$ ), science GPA: pathophysiology ( $p = 0.02$ ) could be determinants for NLE performance.

### 3.3 *Nursing subjects scores*

Breckenridge et al. (2012) established that the undergraduate GPA prior to the nursing major is a significant predictor of passing the NCLEX-RN. Schooley & Kuhn (2013) recognised that the final course grade was significantly predictive of the HESI test ( $p < 0.01$ ). McGahee et al. (2010) explained that the main effects that were most significantly related to NCLEX-RN success were the RN (Registered Nurse) assessment test and theoretical foundations and pathophysiology. Penprase et al. (2013) showed several variables were significant contributors to predicting success on NCLEX-RN such as Comprehensive Adult Nursing I ( $p = 0.004$ ) and pathophysiology. Abbott et al. (2008) found that there are statistically significant findings on the senior complex care grades and NCLEX-RN ( $p = 0.02$ ). Simon et al. (2013) concluded that all nursing courses independently predict NLN-readiness scores. Romeo (2013) showed that the nursing GPA ( $p < 0.001$ ) was the most powerful predictor of the first-time NCLEX-RN pass rate. In addition, Leon (2016) indicated there was low correlation ( $p < 0.001$ ) between NLE performance and academic performance. Nacos-Burds, (2010) found that the practical nursing core GPA was found to be a significant predictor of NCLEX-RN success. In line with the previous mentioned study, McGahee et al. (2010) point out that there was no significant correlation between several variables such as health assessment and pathophysiology and NLE performance.

### 3.4 *Non-academic factors*

Amankwaa et al. (2015) found that there was no statistically significant correlation between sociodemographics such as: gender ( $p = 0.288$ ), age ( $p = 0.180$ ), Christian religion ( $p = 0.210$ ), description of home community ( $p = 0.919$ ), mother's education ( $p = 0.917$ ), and father's education ( $p = 0.796$ ) and performance in licensure examination. Breckenridge et al. (2012) identified that the best predictor of NCLEX-RN pass rate was family income. Benefiel (2011) addressed that gender, ethnicity, and age shown did not have a significant relationship with NCLEX-RN performance. Another study by Whitehead (2016) recognised that the gender and age of the students were not significant predictors of NCLEX-RN performance. Gutierrez (2016) presented that there was significant correlation between the school accreditation status and board performance. Simon et al. (2013) suggest that the transferred students and GPA were significantly predictor of the NLN (National League for Nursing) score Ukpabi (2008) discovered that out of 18 predictor variables in the Assessment Technologies Institute (ATI), only 11 were significant in predicting pass rates of the NCLEX-RN such as: critical thinking, Test of Essential Academic Skills (TEAS), reading, maths, English, mental, pharmacology, fundamental, National League Nursing (NLN) Adult1, NLN adult2, and NLN Paediatric.

## 4 DISCUSSION

Understanding the contributing factors to NLE performance is important not only for the nursing institutions but also students, and the faculty Passing the licensure examination is

required for registration and practice as a nurse. The licensure examination is designed to identify candidates who possess the theoretical knowledge to practice as an entry-level nurse. The findings from this study indicate that the academic factors are the most researched and provide strong evidence to predict success on the NLE. Student's GPA, science score and nursing subjects have a stronger value compare to others (Amankwa et al., 2015; Penprase et al., 2013; Simon et al., 2013; Gilmore, 2008; Reeve, 2014; Outlaw et al., 2013). It is essential a lecturer can monitor students' progress and support them every semester to achieve high grades in every subject. The students could think to attend a special programme to improve their knowledge.

Non-academic factors such as gender, age, religion, parent's education background and family income were mentioned in the studies but not all have significant correlation with the NLE performance. Previous studies did not support the relationship between age, gender, religion, parent's education background and NLE performance (Amankwa et al., 2015; Benefiel, (2011) Whitehead, 2016). This finding is inconsistent with the findings from other researchers who assert that older students perform better (Simon et al., 2013). Accreditation status and level have a significant relationship with NLE performance. Accreditation is the process by which schools are evaluated based on specific standards to ensure the quality of the learning process. It can stimulate institutions to achieve maximum standards and to identify schools whose competence in a particular field warrants public and professional recognition (Gutierrez, 2016). Accreditation is a process that is recognised worldwide as an external quality assurance.

## 5 CONCLUSION

There is much work to be done to advance the identification of determinants of NLE performance. Several significant predictors were identified as academic and non-academic factors. Testing this finding could be a great input as basis for reflection and improvement. Nursing schools should think in terms of updating curricula, teaching styles, or special programmes to support student performance.

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## The effect of a kaleidoscope on pain relief during a venepuncture procedure in children in Padang, Indonesia

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**ABSTRACT:** Various nursing actions and treatment procedures in hospital often cause pain in sick children. The purpose of this study was to analyse the effect of distraction with a kaleidoscope on pain and vital signs. A quasi-experimental investigation was developed in the Emergency Department of Dr M. Djamil Hospital Padang, West Sumatra Province, Indonesia. A consecutive sampling technique was utilised with 20 children being selected. The children were randomly divided into two groups. The mean pain score in the experimental group was 0.80 and in the control group was 3.40, as measured using the Wong-Baker Faces Pain Rating Scale (WBF-PRS). The Mann-Whitney *U* test indicated that there were differences in both groups ( $p = 0.038$ ), with kaleidoscope therapy decreasing diastolic blood pressure ( $p = 0.018$ ) and respiratory rate ( $p = 0.024$ ). The kaleidoscope was a very effective distraction during venepuncture to minimise pain and physiological response. It is suggested that nurses can employ distraction as a routine care element, especially when applying medical procedures.

**Keywords:** pain, distraction, kaleidoscope, vital signs, venepuncture

### 1 INTRODUCTION

Pain is a subjective experience that commonly occurs in children and can be caused by actual or potential tissue damage. Pain in children is difficult to accurately identify. Consequently, pain management can be ineffective and cause negative impacts such as increased intensity, frequency, duration or degree of pain-related damage to children's bodies (Truba & Hoyle, 2014). Pain can have a detrimental influence for physical, emotional, behavioural, cognitive and psychological aspects (Czarnecki et al., 2011; Taddio et al., 2010). Adverse effects can occur such as fear, anxiety and refusal for subsequent procedures (Czarnecki et al., 2011; Taddio et al., 2010), syringe phobia (Taddio et al., 2010), aggressive behaviour and distrust of health care workers (Czarnecki et al., 2011). In addition, physical aspects can affect body systems like cardiopulmonary function, metabolism and the immune system (Czarnecki et al., 2011).

Venepuncture is one of the minor medical procedures that are performed and cause acute pain in children (Sikorova & Hrazdilova, 2011). Venepuncture is the second most common procedure that can cause moderate to severe pain in children (Stevens et al., 2011), and Hartling et al. (2013) stated that venepuncture and intravenous infusion are the most common procedures in the emergency department.

Professional nurses should understand the importance of pain management (Wong et al., 2012). Pain management is divided into two approaches, namely pharmacological and non-pharmacological (Taddio et al., 2010). Distraction is one of the non-pharmacological interventions that distracts children's attention from painful stimuli (El-Gawad & Elsayed, 2015), a cognitive-behavioural approach to decreasing pain during invasive procedures on children in the emergency department (Wente, 2013). Distraction is a nursing intervention that is easy, inexpensive, and effective (Bagheriyan et al., 2012), and adjusts vital signs in the physiological response of pain (El-Gawad & Elsayed, 2015; Kiani et al., 2013).

Many experimental studies on distraction reduce pain significantly, including the use of kaleidoscopes (Birnie et al., 2014). A kaleidoscope is a toy that attracts children's attention when they look into it, so that they do not focus on the pain of invasive procedures (Tüfekci et al., 2009). Canbulat et al. (2014) stated that using a kaleidoscope may result in lower pain scores in school-age children during venepuncture. In Indonesia, the study of distraction with a kaleidoscope as a form of pain management has not yet been undertaken. Thus, the purpose of this study was to determine the effect of distraction using a kaleidoscope as a form of pain relief for children undergoing venepuncture.

## 2 METHODS

The method was a quasi-experimental, aiming to provide an overview of each variable and determine the effect of distraction using a kaleidoscope on reducing pain scores and changing the vital signs of children undergoing venepuncture. The population involved children who visited the emergency department. The sampling method was consecutive, yielding a total of 20 samples.

The inclusion criteria were: 1) aged 6–11 years old; 2) undergoing venepuncture; 3) able to communicate verbally and non-verbally; 4) parents are willing to be respondents. Exclusion criteria were: 1) in a critical condition; 2) uncooperative parents. The research was conducted from 11 August to 3 October 2016 in the Emergency Department of Dr M. Djamil Hospital, Padang. Data collection was conducted using the Wong-Baker Faces Pain Rating Scale (WBF-PRS), wrist blood pressure and a stopwatch.

This study obtained ethical clearance from the Ethical Commission of the Faculty of Medicine, University of Andalas. The parents provided written informed consent prior to data collection. Confidentiality was guaranteed regarding information and the children's identity. The statistical test applied to prove the hypothesis was the Mann–Whitney  $U$  test, as the data were not normally distributed ( $p < 0.05$ ).

## 3 RESULTS

Table 1 illustrates that most of the children in both groups were nine years old. In terms of gender, the control group was dominated by male children, while the experimental group had an equal number of both sexes. Regarding previous experience of venepuncture, most children in the control group had a previous history. Meanwhile, more than half of the children in the

Table 1. Respondent characteristics by age, gender and experience of blood sampling.

	Control	Experimental
Characteristic	<i>f</i> (%)	<i>f</i> (%)
Age (years):		
6	0 (0)	2 (20)
7	2 (20)	2 (20)
8	2 (20)	1 (10)
9	4 (40)	3 (30)
10	1 (10)	0 (0)
11	1 (10)	2 (20)
Gender:		
Male	7 (70)	5 (50)
Female	3 (30)	5 (50)
Previous venepuncture:		
No	3 (30)	4 (40)
Yes	7 (30)	6 (60)

Table 2. Comparison of pain level felt by children during the procedure.

Variable	Group	Mean	Min	Max	<i>p</i> value
Pain score	Control	3.40	0	4	0.038
	Experimental	0.80	0	8	

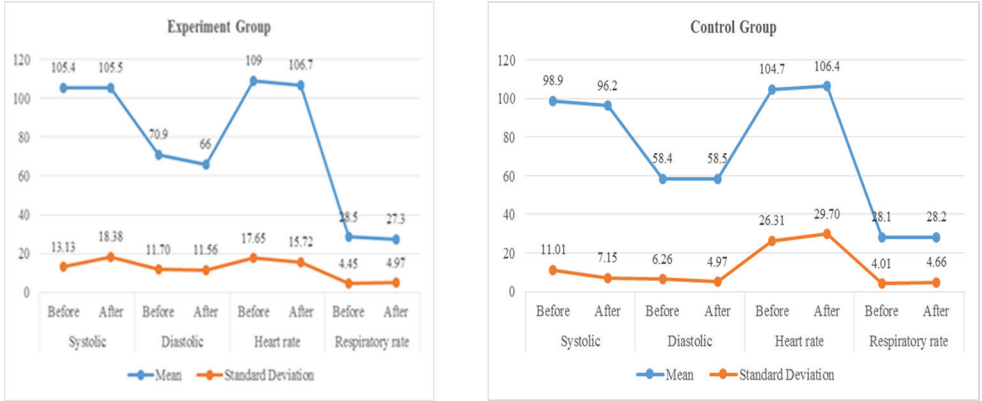


Figure 1. Comparison of vital signs before and after distraction during the procedure.

Table 3. Vital signs comparison between control and experimental groups after the procedure.

Variable	Group	Mean	SD	<i>p</i> value
Systolic b.p.	Control	96.20	7.146	0.153
	Experimental	105.50	18.380	
Diastolic b.p.	Control	58.50	4.972	0.076
	Experimental	66.00	11.557	
Pulse rate	Control	106.40	29.703	0.978
	Experimental	106.70	15.702	
Respiratory rate	Control	28.20	4.662	0.681
	Experimental	27.30	4.968	

experimental group had a history. Table 2 indicates that there was a significant difference in pain scores between the control and experimental groups, with a *p* value of 0.038.

From Figure 1, the *p* values of systolic blood pressure and pulse rate were 0.977 and 0.225, respectively. This shows that there was no significant difference in systolic blood pressure and pulse rate before and after administering distraction. Meanwhile, *p* values of diastolic blood pressure and respiratory rate were 0.018 and 0.024, respectively, which means that there was a significant difference before and after venepuncture using the kaleidoscope. Looking at the *p* values in the control group for systolic and diastolic blood pressures, pulse and respiratory rate, they were, respectively, 0.175, 0.614, 0.323 and 0.780. The figure shows that there was no significant difference before and after venepuncture.

As displayed in Table 3, all *p* values were above 0.05, indicating that there was no significant difference between the control and experimental groups after venepuncture.

#### 4 DISCUSSION

The average pain score in the experimental group after kaleidoscope distraction was 0.80. The lowest value was 0 (no pain) and the highest was 4 (slightly more painful). Overall, most

respondents did not feel any pain during venepuncture while using the kaleidoscope. However, the average pain score of the control group was 3.40. The lowest value was 0 and the highest was 8 (very painful). Overall, most respondents felt pain ranging from slightly painful to very painful and only a few children had no pain during venepuncture. The statistical analysis proved that there was a significant difference in pain scores between the experimental and control groups. The present findings seem to be consistent with other studies that found that a kaleidoscope significantly reduced pain (Karakaya & Gözen, 2015; Canbulat et al., 2014; George & Vetrisevi, 2015).

There are possible explanations for this result. The selection of a proper distraction for children is very important, so that their attention can be diverted from the painful procedure (Bagheriyan et al., 2012). A kaleidoscope as a visual distraction that produces shapes and colours can be an option (Canbulat et al., 2014). It is not only its shape and colour but also when the kaleidoscope is circling, it creates various colours and shapes such as beads which are uniquely adapted to the movement (Tüfekci et al., 2009). Children's focus on the kaleidoscope can distract them from painful procedures. Another possible explanation for this is that distraction can provide an analgesic effect by altering a person's emotions (Johnson, 2005). These can be changed by providing a distraction that reduces anxiety and then improves mood and motivation. As a result, pain can be minimised, as the attention has been shifted. In addition, distraction can also effectively reduce pain due to the child's willingness to use it. The shapes and colours inside a kaleidoscope encourage children to use it during treatment. Johnson (2005) noted that distraction is an effective and useful method if children are willing to use it.

Diastolic blood pressure before venepuncture was 70.90 and declined thereafter to 66.00, with a  $p$  value of 0.018. This means that there was a significant difference in average diastolic blood pressure before and after venepuncture with distraction. A similar trend was found in respiratory rate, where an average of 28.50 was recorded before venepuncture and decreased thereafter to 27.30, with a  $p$  value of 0.024. This result is in agreement with the findings of El-Gawad and Elsayed (2015), which reported a decrease of systolic and diastolic blood pressures, pulse and respiratory rate, with  $p$  values, respectively, of 0.014, 0.023, 0.001 and 0.002 in the experimental group before and after the distraction. This means that distraction had a significant influence on vital signs.

What is surprising is that the kaleidoscope did not affect systolic blood pressure and pulse rate. In this study, there was a slight increase in systolic blood pressure. It seems that these results are possible due to the fact that some of respondents have problems with their kidneys. Kidney problems can lead to intravascular fluid changes that have an impact on stimulation of the sympathetic nervous system (Craven & Hirnle, 2009). Meanwhile, the pulse frequency slightly decreased. Distraction can help minimise pain and anxiety that impact on the vital signs. In line with Farrokhnia et al. (2011), distraction can reduce the chemical and physiological changes resulting from anxiety and discomfort due to invasive procedures. It will inactivate the autonomic nervous system, hence there is no increase in vital signs. Therefore, distraction is very efficient and considered for use in such invasive procedures.

In the control group, the current study found that the systolic and diastolic blood pressures went down after venepuncture, while the pulse and respiratory rate rose thereafter. To our surprise, no differences were found in vital signs before and after the procedure. This result is in agreement with the findings of McClellan et al. (2009), which revealed that the pulse rate did not show any significant differences before and after venepuncture. In contrast, Hosseini et al. (2016) reported that there were differences in vital signs before and after a bone marrow aspiration without distraction. A possible explanation for this might be that the pain felt by the individual in the control group may cause changes in vital signs. In accordance with Farrokhnia et al. (2011), the signal of pain is received by the hypothalamus, which then stimulates the sympathetic nervous system, causing an escalation in pulse rate and blood pressure and uplifts in intake of oxygen.

This study indicates that there was no difference in vital signs of both groups after the procedure. These results matched those observed in earlier studies. Hosseini et al. (2016) indicated that there was no significant difference in the vital signs after the procedure. Further,

these findings supported the results of Hartling et al. (2013) who also found no significant difference in pulse rate during invasive procedures between a group receiving music therapy and a control group. A possible explanation for these results may be due to the activation of the autonomic nervous system, which is caused by pain, anxiety, exercise and changes in intravascular volume (Craven & Hirnle, 2009).

In this study, there were haemophilia patients in the control group. Haemophilia can cause a fluid volume deficiency. Lack of fluid volume can reduce a child's blood pressure (Craven & Hirnle, 2009). This may cause the blood pressure in the control group to be lower than in the experimental group. In terms of respiratory rate, the control group had a higher rate than the experimental group. This may happen due to the stress of hospitalisation for children (Craven & Hirnle, 2009). The limitations of this study include the number of samples that are lacking, as well as the diagnosis of diseases as a difference that may influence the vital signs.

## 5 CONCLUSION

This study concludes that distraction using a kaleidoscope can effectively reduce pain and vital signs adjustment. There was a significant difference in pain scores between the experimental and control groups. A kaleidoscope can be an option for nurses to minimise pain in children due to invasive measures such as venepuncture.

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## Analysis of phlebitis occurrence in terms of the characteristics of infusion by nurses in RSI Ibnu Sina Payakumbuh

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**ABSTRACT:** The purpose of this study is to determine the level of nurse compliance in using aseptic techniques to install an infusion and its relationship with the phlebitis incidence in RSI Ibnu Sina Payakumbuh. This study is a descriptive analytic study using cross-sectional methods and applying a proportional stratified random sampling technique. This research uses observation sheets based on Standard Operating Procedure (SOP) at RSI Ibnu Sina Payakumbuh as the instrument. The instrumentation of phlebitis occurrence is based on the phlebitis grade in the standard practice of the Infusion Nurses Society (INS). The results revealed a phlebitis incidence of 25.6%, while the nurse compliance was 55.8%. Bivariate test results indicate a  $p$  value of 0.012 ( $< 0.05$ ), which shows a relationship between nurse compliance in using aseptic techniques during the installation of an infusion and the phlebitis incidence in RSI Ibnu Sina Payakumbuh.

**Keywords:** phlebitis, infusion characteristics, nurses

### 1 INTRODUCTION

Hospitals provide health services in the form of inpatient, outpatient and emergency services (Permenkes RI No. 340/PER/III/2010)(Depkes RI,2010). Every medical action always puts patient safety first and minimises risk. This aims to improve safety, avoid injury and improve the quality of care (Susianti, 2008). to measure continuous safety (Darmadi, 2008). Patient safety is focused on reducing nosocomial infections, decubitus and drug delivery errors, and ensuring patient satisfaction with healthcare. Nosocomial infection is an infection that occurs in patients while in hospitals or other health facilities (Darmadi, 2008). Previous nursing contact (even up to 24 hours) with the patient plays an important role in contributing to the incidence of nosocomial infection (Nursalam, 2011). A WHO study showed that approximately 8.7% of 55 hospitals in 14 countries in Europe, the Middle East, South-East Asia and the Pacific, and as many as 10.0% of hospitals in South-East Asian countries, reported cases of nosocomial infections, known as Hospital-Acquired Infection (HAI) (Putri, 2016). Among the many types of nosocomial infections, phlebitis ranks first compared to other infections (Brunner & Suddarth, 2013). Phlebitis has become an indicator of a hospital's minimum service quality, with an incidence standard of  $\leq 1.5\%$  (MOH Department of Health, 2008). In Indonesia, there is no defined incidence of phlebitis, probably because studies and publications related to phlebitis are rare. Data from Department of Health the Indonesian Ministry of Health (MOH Department of Health) in 2013 showed that the amount of phlebitis incidence in Indonesia was 50.11% for public hospitals and 32.70% for private hospitals (Department of Health-MOH, 2013). Many factors cause the occurrence of phlebitis. One factor is the aseptic or sterile techniques used during infusion. Disinfection of the area around the puncturepiercing with 70% alcohol, and sterilisation of the tools used play an important role in avoiding inflammatory complications. This can be done by, for example, washing hands before taking action and disinfecting the area around the puncture (Brunner & Suddarth, 2013). The presence of bacterial phlebitis can be a serious problem, as it predisposes to systemic complications

(septicaemia). Factors contributing to the incidence of bacterial phlebitis include inadequate handwashing techniques, incomplete aseptic techniques at the time of piercing, poor catheter insertion techniques, and prolonged installation. The principle of the installation of intravenous (IV) therapy takes into account the principle of sterilisation. This is done to prevent contamination caused by intravenous needles (Rizky, 2014).

The results of research conducted by Mada et al. (2012) at Christian Hospital Lende Moripa found an inadequate application of the sterile infusion principle of 64.3% (36 persons). The application of the sterile principle involves its application prior to the installation of the IV, while performing the action, and when cleaning the appliance. Such applications are said to be sufficient if they fit the correct sterile infusion technique. Based on data from the Indonesia Infection Prevention Supervisory Team (IPCN) and the nosocomial infection control team in hospitals in 2015, an average of 28 cases, or about 5.9% of cases, of phlebitis occur in RSI Ibnu Sina Payakumbuh every month. From observations of six nurses (two nurses were assigned at random), it was found that two nurses had washed their hands both before and after intravenous treatment and four other nurses simply washed their hands after intravenous treatment. information head of the internal medicine room says that phlebitis is a complication of infusion. The role of nurses in reducing the incidence of phlebitis is very important, because the nurse is the operator who performs the infusion installation. Among the many factors that cause phlebitis, the aseptic technique performed by the nurse at the beginning of the IV should be of concern.

## 2 METHOD

This study uses descriptive analytical research with a cross-sectional approach. The aim is to analyse the incidence of phlebitis in terms of the infusion characteristics used by nurses at RSI Ibnu Sina Payakumbuh in 2016. The population is all of the nurses in the emergency unit, internal medical unit, operating room, and VIP room. A sample of 43 nurses met the criteria. The sampling used was a proportional stratified random sampling method (Arikunto, 2014). Research was for one month from 20 November to 20 December 2016. The research instrument is an observation sheet based on Standard Operating Procedure (SOP) at RSI Ibnu Sina Payakumbuh. The instrumentation of the occurrence of phlebitis is based on class phlebitis from the standard practice of the Infusion Nurses Society (INS). the incidence of phlebitis was assessed before 72 hours after intravenous infusion.

## 3 RESULTS

### 3.1 *Phlebitis occurrence*

Table 1 shows that there were 11 patients (25.6%) experiencing phlebitis in RSI Ibnu Sina Payakumbuh during the observation period.

### 3.2 *Characteristics of infusion installation based on stab location and catheter size of IV*

Table 2 shows that the infusion location was most often in the cephalic vein (74.4%) and the most common catheter size was number 18 (46.5%).

Table 1. frequency distribution of phlebitis occurrence (n = 43).

Variable	<i>f</i>	%
No phlebitis	32	74.4
Phlebitis	11	25.6

Table 2. Frequency distribution by installation location and size of IV catheter (n = 43).

Variable	<i>f</i>	%
a. Vena locations		
Metacarpal vein	7	16.3
Cephalic vein	32	74.4
Basilic vein	4	9.3
b. IV catheter		
Number 18	20	46.5
Number 20	14	32.5
Number 22	9	20.9

Table 3. Frequency distribution based on nurse compliance in carrying out the aseptic technique in the installation of the infusion (n = 43).

Variable	<i>f</i>	%
Compliance	19	44.2
Non-compliance	24	55.8

Table 4. Relationship between nurse compliance in using aseptic techniques for infusion and phlebitis in RSI Ibnu Sina Payakumbuh (n = 43).

Aseptic technique	Phlebitis occurrence						<i>p</i> -value
	No phlebitis		Phlebitis		Total		
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	
Compliance	18	94.7	1	5.3	19	100	0.012
Non-compliance	14	58.3	10	41.7	24	100	

### 3.3 Nurse compliance

Table 3 indicates that more than half of the respondents (55.8%) did not comply with the standard aseptic techniques when performing the infusion.

### 3.4 Bivariate analysis

Table 4 shows that the phlebitis incidents in this study happened more frequently among nurses who were non-compliant when using aseptic techniques for the infusion (41.7%). The statistical test (chi-squared) resulted in a *p* value = 0.012 (< 0.05). This indicates that there is a significant relationship between nurse compliance when using aseptic techniques for the infusion installation and phlebitis incidence.

## 4 DISCUSSION

This study found a relatively high incidence of phlebitis (25.6%) in RSI Ibnu Sina Payakumbuh, compared with the standard  $\leq 1.5\%$  set by the Ministry of Health. This high number can damage the quality of hospital services. In addition, a significant association between a nurse's compliance when using infusion aseptic techniques and incidences of phlebitis was also identified. Forecasting researchers showed that less than half (48.8%) of nurses washed their hands before performing aseptic techniques. In fact, handwashing should be done both

before and after the action (Nursalam, 2011), although the nurses also use gloves and other protective equipment. Handwashing is important in order to reduce the spread of microorganisms that are present on the hand, such that the spread of infection can be minimised and the working environment is protected from infection. In addition, all nurses can use 70% alcohol as a disinfectant. This suggests that the area to be penetrated can be disinfected with an antiseptic solution, such as providone, iodine, 70% alcohol, or chlorhexidine (Perry and Potter's (2005) and did not touch the disinfected area as much as (27.9%), only 32.6% nurses did well.. A nurse ideally has a basic knowledge of the various theories related to infusion therapy. This will affect their behaviour, especially with respect to the principles relating to the prevention of complications. Nurses should be aware of the principles and techniques of asepsis, including stability, storage, labelling, interaction, dosage and calculation, and also of the appropriate equipment needed to provide safe infusion therapy to patients (Wayunah, 2012). In addition, the infusion action is delegated to the nurse, so the nurse must understand the correct methods and techniques to infuse, administer intravenous fluids and maintain intravenous systems (Potter & Perry, 2005). The incidence of phlebitis in our study was also due to more infusions being applied to the metacarpal vein (28.6%) than the other two veins. The results are in line with the studies of Lindayanti and Priyanto (2013), where the occurrence of phlebitis is based on the location of the intravenous catheter, which is most commonly placed in the distal venous region (45.5%). The location of the vein has a significant relationship with the occurrence of phlebitis because the distal blood vessels are closer to the joint and more easily moved, so that friction occurs in the vein wall due to intravenous catheters.

Potter and Perry (2005) suggested that changing the position of the limb, especially in terms of the wrist or elbow, can reduce the rate of infusion and affect blood flow. The use of a cephalic vein (located away from the wrist) is a better choice. The 6% incidence of phlebitis (the MOH standard is  $\leq 1.5\%$ ) is known by observing the location of the installation and by observing the signs and symptoms of phlebitis, including pain along the cannula, erythema, redness at the stabbing site, and fever (Potter & Perry, 2005). The high incidence of phlebitis in this study is also due to the incorrect application of standard infusion procedures, such as a nurse who does not properly wash their hands, does not wear / change gloves or does not use proper disinfection techniques, and contamination of the infusion equipment during installation.

Phlebitis is an acute inflammation of the internal venous layer that is characterised by pain along the vein, redness, swelling and warmth, and can be felt around the puncture area. Phlebitis is a complication that is often associated with intravenous therapy (Nursalam, 2014; Brunner & Suddarth, 2013). Phlebitis can be prevented by performing aseptic techniques during infusion, using the correct IV size for the patient's veins, choosing the right veins, the type of fluid, and most importantly, the disposal of the 72-hour aseptic mounting location (Brunner & Suddarth, 2013). Our study is in accordance with the research of Rusnawati (2015), where the incidence of phlebitis in the hospital is also high (45.4%). The incidence of phlebitis is one indicator of hospital service quality. By obtaining a  $p$ -value of 0.012 ( $< 0.05$ ) from the statistical test (chi-squared), it can be concluded that there is a significant correlation between compliance in using aseptic techniques for infusion installation and phlebitis occurrence. This relationship was also shown in previous research (Ince, 2010), which stated that there is a relationship between nurse compliance in applying standard infusion procedures and the occurrence of phlebitis. Phlebitis occurs due to the improper application of standard infusion procedures. The sterile principle in the installation is intended to prevent the entry of microorganisms during the installation of the infusion. According to Philip and Gorski, cited in Rusnawati (2015), aseptic techniques should be performed during every clinical procedure, including infusion, to reduce the risk of infection.

The results of our study indicate that with disinfection at the time of intravenous infusion using non-aseptic techniques, many (41.7%) have phlebitis. The study is in accordance with the statement of Phillips and Gorski, cited in Rusnawati (2015), that unsterile insertion sites are pathways for bacteria that can cause infection. This suggests that disinfection

using non-aseptic techniques may increase the risk of the occurrence of phlebitis. The study also showed that of the patients who were disinfected using aseptic techniques (44.2% of the total), 5.4% also had phlebitis. The occurrence of phlebitis in patients undergoing infusion using aseptic techniques may be due to other factors, such as the physical condition of patients who move too much and often fold the infusion hand. However, large size IVs can also cause phlebitis. According to Brunner and Suddarth (2013), phlebitis can be caused by large IVs. Therefore, the size of the IV catheter should be adjusted to the conditions of the patient's blood vessel and therapy should be given.

## 5 CONCLUSION

From the description of the research results above, it can be concluded that: site setting and the selection of the IV catheter is crucial in the occurrence of phlebitis; nurse compliance in performing aseptic techniques is lacking in some aspects; there is a significant relationship between the characteristics of infusion and the incidence of phlebitis.

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