JOURNAL OF THE
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# Factors Influencing the Choice of Anesthesiology as a Specialty by Medical Students at a University in Manila*

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## ABSTRACT

Anesthesiologists are pioneers in perioperative medicine, intensive care, pain management and patient safety. However, anesthesiology is not among the top specialties considered as a future career by medical students. The study aims to identify factors that influence fourth-year medical students' (clinical clerks) choice of anesthesiology for specialty training in the future. A cross-sectional research study,that was conducted between October to November 2019 among fourth-year medical students of the University of Santo Tomas-Faculty of Medicine and Surgery who underwent their clinical rotation in anesthesiology. Data were collected using a self-administered questionnaire. The questionnaire included demographic characteristics, specialty preferences, what factors attract the respondents to choose their preferred specialty and how these relate to choosing anesthesiology as a career. Summarization of data was done using frequencies/proportions and graphs, and significance level was set at *P*-value less than 0.05.

The following factors influence the choice of anesthesiology as a top three preferred specialty as a career: personal interest, positive influence during clerkship, income, enough time for leisure activity, and short length of training.

## INTRODUCTION

### I. Background and Significance of the Study

Medicine is a vocation. It is service-oriented filled with meaning and the purpose of using a physician's knowledge and skills "in the service of protecting and restoring human well-being" (1). The field of anesthesiology is a specialty where a physician can apply knowledge and skills toward patient care with effects that are immediately visible. Anesthesiologists are pioneers in perioperative medicine, intensive care, pain management and patient safety (2). Aside from operating rooms, anesthesiologists also provide patient care in non-operating room areas like the intensive care units, pain clinics and remote locations such as radiology suites, endoscopy units, cardiac catheterization laboratories and the like. In the future, the services of anesthesiologists will be in high demand as the life expectancies of patients increase and with it, more co-morbidities. Technology has become advanced with more less-invasive procedures that will be developed requiring patients who are still, sedated, and pain-free.

Anesthesiology is ranked low among the medical specialties considered by medical students as a future career. Reasons include incomplete understanding of the roles of an anesthesiologist in patient care (3). Studies have shown that gender is a factor in choice of specialty, with females more likely to consider anesthesiology as a career. (4,5). Lifestyle is also one of the factors that influenced senior medical students. Anesthesiology, along with radiology and emergency medicine have been identified as specialties that provide controllable lifestyles (CL) (6).

As of December 2017, doctors rank second among the top four categories of health professionals working in health institutions in the Philippines, 91% of which are working in hospitals and the remaining 9% working in the non-hospital and primary care setting (7,8). In a survey done by the Pharmaceutical and Health Care Association of the Philippines (PHAP), 68% of the physicians surveyed are specialists and 32% are general practitioners. Among the medical specialties, the most common are internal medicine (17.5% of all physicians), pediatrics (15.5%), obstetrics and

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gynecology (12.5%) and surgery (10.6%). Anesthesiology is not included among the top ten medical specialties in the Philippines.

According to the Bland-Meurer model of medical specialty choice, medical students were able to choose their future medical specialty when their perception of the specialty and their personal and social needs align. (9). In a systematic review by Querido et. al, there are five main categories of factors affecting choice of medical specialty: medical school characteristics, in which the school influenced the students perception of different medical specialties; student characteristics such as age and gender; student values, career needs to be satisfied such as personal preferences; career needs that must be met such as work–life balance, and perception of specialty characteristics. (10)

Multiple studies showed that the personal and clinical experiences of medical students have a big impact in their choice of medical specialty. These include physician role models, work environment and positive encounters with patients and physicians in the fields they are interested in. (11,12,13)

A total of 911 senior medical students surveyed in 4 studies showed that the top 4 preferred specialties were internal medicine, obstetrics and gynecology, pediatrics and surgery. The most common influential factors were intellectual content of the specialty, career opportunities, experience during clerkship, controllable lifestyle and doctor-patient relationship. (4,5,14,15) Among the least common influential factors were prestige of the specialty and income.

Specialties identified to provide controllable lifestyles (CL) include emergency medicine, dermatology, anesthesiology, radiology, neurology, ophthalmology, pathology and psychiatry. According to a study done by Schwartz, these CL specialties saw an increased interest from senior medical students in the United States during the period of 1978-2001. In contrast, non- CL specialties such as family medicine, internal medicine, pediatrics and general surgery experienced declined interest. (16)

Anesthesiology consistently ranked low among the top specialty choices by graduating medical students. Numerous international studies (17,18) noted less than 5% of graduating medical students expressed interest in anesthesia. Factors that influenced their choices include personal interest, future job opportunities and requirement of specialized skill. The most frequently-named factors for not choosing anesthesiology are long work hours and high stress level, insufficient mentorship, and low job opportunity. (17)

In studies conducted among residents training in anesthesiology by Charuluxanan and Augustin, reasons for choosing anesthesiology are responsibility of patient on a per case basis, influenced by an anesthesiologist as a role model, limited number of patients under responsibility, anesthesiology is a "hands-on" specialty, inclusion of critical care medicine in the scope of training/practice, opportunities to perform invasive procedures and work gratification. (20,21) These residents also rated their specialty training in anesthesiology as highly satisfactory, and would choose the same specialty again if given the chance.

Thus, the aim of the study is to determine the factors that influence the choice of anesthesiology as a future career by fourth-year medical students. Identifying the factors could have an influence on the improvement of the clinical rotation of the students in anesthesiology, maximize their exposure to the field of anesthesiology and encourage and nurture potential future anesthesiologists.

## Objectives

1. General Objective
   a. To determine the factors that influence the choice of anesthesiology among fourth-year medical students as a future specialty

2. Specific Objectives
   a. To identify and measure the following factors:
      i. Residency programs most likely to be selected by students
      ii. Attitudes of fourth-year medical students regarding anesthesiology as a specialty

### II. Scope and Limitations

This cross-sectional study is limited to the determination of factors that influence the choice of anesthesiology as a future career by fourth-year medical students of the University of Santo Tomas-Faculty of Medicine and Surgery.

The study was conducted among fourth-year medical students currently enrolled at the University of Santo Tomas Faculty of Medicine and Surgery, a private academic institution. As fourth-year (clinical clerks), they undergo a permanent rotation to the department of anesthesiology incorporated into the two-month rotation in the department of surgery. The findings of the study may or may not be similar among graduating medical students of other institutions.

After fourth-year (clinical clerkship), the medical graduates have to undergo a one-year postgraduate internship program. During this time their decision may change regarding their choice of specialty training.

## METHODOLOGY

### I. Study Design

This is a cross-sectional research study, which was conducted among fourth-year medical students (clinical clerks) of the University of Santo Tomas Faculty of Medicine and Surgery using a self-administered questionnaire. Following approval from the USTH Institutional Review Board, data was collected from October to November 2019.

### II. Study Site

The study was conducted at the University of Santo Tomas Hospital, a tertiary private institution located in the City of Manila.

### III. Study Population

Fourth-year medical students (clinical clerks) of the University of Santo Tomas – Faculty of Medicine and Surgery

#### Inclusion Criteria

1. Currently undergoing their clinical rotation in anesthesiology
2. Completed their clinical rotation in anesthesiology

#### Exclusion Criteria

1. Did not undergo clinical rotation in anesthesiology
2. Does not intend to undergo residency training

#### Termination Criteria

1. Insufficient data on the questionnaire

### IV. Sampling Methodology

Convenience sampling was employed to select study participants. Survey questionnaires will be distributed at the end of their clinical rotation in anesthesiology.

### V. Sample Size Determination

OpenEpi was used to calculate the minimum sample size of the study. Specifying a design effect of 1, margin of error equal to 5%, and finite population of 500, the minimum sample size required is 217 at a confidence level of 95%. However due to the feasibility to achieve the required sample size, the confidence level was adjusted to 80%, with the computed sample size of 124.

### VII. Data Collection and Analysis

Questionnaires were distributed to fourth-year medical students (clinical clerks) at the end of their clinical rotation in anesthesiology. Written informed consent was obtained from those who are willing to participate. Students who did not wish to take part in the study were not compelled or persuaded to do so. The questionnaires were personally administered by the author. A designated envelope was prepared where the accomplished questionnaires were kept.

The questionnaire used elicited information on socio-demographic characteristics, decisions

about specialization, and possible factors that affected choice of specialty. The factors selected were obtained from the literature review. A total of 24 factors indicated in the questionnaire as influencing choice of specialty were categorized into experiences during undergraduate training, personal factors and specialty-related factors. Provision was also made for other factors not included in the questionnaire.

### VII. Data Analysis Plan

Data was encoded in MS Excel by the researcher. Statistical analyses were done using SPSS version 20. In testing each influencing factor's association with the inclusion of anesthesiology in the preference, Cramer's V coefficient was used at 20% level of significance. Aside from comparing each influencing factors one by one, multiple logistic regression was used to compare which among all of the influencing factors appear to be significantly contributing to the inclusion of anesthesiology in the preference. Positive and negative contributors were noted also at 20% level of significance.

## RESULTS AND DISCUSSION

A total of 146 questionnaires were completed. Majority of the respondents were female (56%), single (97.9%), with an average age of 24.3 years old. Twenty-three percent (23%) of the respondents' fathers and 31% of the respondents' mothers are into professions related to healthcare. Majority of the respondents' education were supported by both parents (75%) while 5% had scholarship grant as students. Ninety-seven (97%) expressed interest to go to subspecialty training.

Figure 1 showed that among all the specialties listed, Surgery was preferred the most, followed by Anesthesiology and Internal Medicine. As for the first choice, the most preferred specialty is Surgery, followed by Internal Medicine and Pediatrics. As a second choice, the top three specialties are Surgery, followed in second place by Internal Medicine, Anesthesiology and Orthopedics, and Pediatrics. For the third choice the top three specialties are Anesthesiology, Surgery and Neurology and Psychiatry. Of note is that respondents surveyed were currently in the middle of their Surgery rotation.

**Figure 1. Breakdown of Respondents Including the Specializations in the Top 3 Preferences**

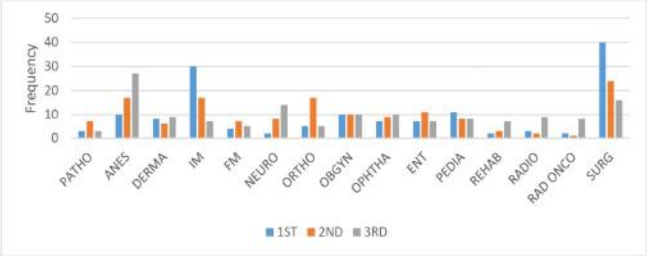


Table 1 showed the most common factors that influenced the choice of specialty are personal interests (97.9%), future job opportunities (88%), income (82%) and lifestyle and rewards and opportunity for private practice (80%). The factors that showed the least influence during subspecialty choice are little on-call commitment and others' perception of the job (36%), low risk of litigation (28%), and opportunity to do research, and gender distribution in specialty (16%). At the end of the respondents' anesthesiology rotation, they were inspired to take anesthesiology as a future career (39%). At the same time, 32% of the respondents showed that although the rotation inspired interest in anesthesiology, they will not choose it because of their perceived little success in the field. Four (4) respondents were decided to pursue anesthesiology prior to the anesthesiology rotation while the nine (9) respondents were decided against a career in anesthesiology. In addition, the demographic characteristics of the respondents did not significantly influence the respondents' decision to specialize in anesthesiology. Table 2 showed respondents indicated opportunity to do research, little on-call commitment, low risk of litigation, and gender distribution in specialty as the influencing factors. These were also the factors mostly associated with the negative choice and not including anesthesiology among the top three preference; while those respondents who indicated personal interest, positive influence during clerkship, income, enough time for leisure activity, and short length of training were mostly associated with respondents choosing anesthesiology in their top three preference. (See Appendix D for tests for association).

**Table 1. Factors Influencing Fourth-year medical students in Choosing a Specialty**

| Influences | Percentage |
|---|---|
| 5 Most Influential | |
| Personal Interest | 97.9 |
| Future Job Opportunities | 88 |
| Income | 82 |
| Lifestyle and Rewards | 82 |
| Opportunity for Private Practice | 80 |
| 5 Least Influential | |
| Little On-Call Commitment | 36 |
| Other People's Perception of the Job | 36 |
| Low Risk of Litigation | 28 |
| Opportunity to do Research | 16 |
| Gender Distribution in Specialty | 16 |

Among the 24 influencing factors, the logistic model was able to identify significant factors affecting the inclusion of anesthesiology in preference (Table 3). Influencing factors such as Influence from a mentor, and other people's perception of the job were found to decrease the probability of including anesthesiology in the top three preference. This was shown by having p-values less than 0.2 and with beta coefficients (B) less than 0. On the other hand, influencing factors such as Prestige, Positive Influence During Clerkship, Enough Time For Leisure Activity, Short Length of Training, and Gender Distribution of Specialty were found to increase the probability of including anesthesiology in the top three preference. This was shown by having p-values less that 0.2 and with beta coefficients (B) greater than 0.

**Table 2. Factor Analysis**

| Choice of Anesthesiology | |
|---|---|
| **Positively Associated With** | **Negatively Associated With** |
| Personal Interest | Opportunity to do research |
| Positive Influence During Clerkship | Little on-call commitment |
| Income | Low risk of litigation |
| Enough time left for leisure activity | Gender distribution in specialty |
| Short length of training | |

**Table 3. Coefficients of Influencing Factors to Inclusion of Anesthesiology in Preference**

| *Influencing Factors* | *B* | *S. E.* | *Wald* | *df* | *p-value* | *Exp(B)* |
|---|---|---|---|---|---|---|
| *Personal Interest* | 20.762 | 23205.423 | .000 | 1 | .999 | 103.9 |
| *Future Job Opportunities* | -.615 | .798 | .594 | 1 | .441 | .541 |
| *Specialized Skill* | -.615 | .579 | 1.129 | 1 | .288 | .540 |
| *Lifestyle* | -.879 | .642 | 1.877 | 1 | .171 | .415 |
| *Prestige* | .878 | .506 | 3.006 | 1 | .083 | 2.405 |
| *Close Interaction* | .615 | .538 | 1.307 | 1 | .253 | 1.850 |
| *Clerkship Influence* | 1.907 | .676 | 7.953 | 1 | .005 | 6.730 |
| *Research* | -.524 | .587 | .797 | 1 | .372 | .592 |
| *Flexibility* | -.844 | .704 | 1.437 | 1 | .231 | .430 |
| *Patient Contact* | -.171 | .571 | .089 | 1 | .765 | .843 |
| *Technically Challenging* | -.412 | .531 | .601 | 1 | .438 | .662 |
| *Income* | .873 | .771 | 1.279 | 1 | .258 | 2.393 |
| *Private Practice* | -.709 | .663 | 1.145 | 1 | .285 | .492 |
| *Compatible with Family* | -.412 | .588 | .490 | 1 | .484 | .663 |
| *Inclination of Specialty* | -.316 | .583 | .294 | 1 | .588 | .729 |
| *Variety of Caseload* | -.196 | .560 | .123 | 1 | .726 | .822 |
| *Mentor Influence* | -.941 | .553 | 2.895 | 1 | .089 | .390 |
| *Time for Leisure* | 1.744 | .742 | 5.527 | 1 | .019 | 5.720 |
| *Short Training* | .785 | .550 | 2.036 | 1 | .154 | 2.191 |
| *Family Influence* | -.092 | .533 | .030 | 1 | .862 | .912 |
| *Perception* | -.871 | .571 | 2.328 | 1 | .127 | .419 |
| *On call* | -.294 | .634 | .215 | 1 | .643 | .745 |
| *Low risk of Litigation* | .453 | .625 | .525 | 1 | .469 | 1.573 |
| *Gender Distribution* | 1.658 | .682 | 5.909 | 1 | .015 | 5.251 |
| *Constant* | -21.203 | 23205.423 | .000 | 1 | .999 | .000 |

As shown consistently with other published studies, medical students have placed importance on the lifestyle, and amount of leisure and personal time as influencing factors in the choice of specialty. Anesthesiology was frequently seen as a specialty that provides controllable lifestyle (CL), or the ability to control work hours, together with radiology, and emergency medicine. In the study by AlKhilawi et. al, sixty (60) percent of their respondents chose controllable lifestyle as an important criterion for selection of residency programs (6,15,22,23). Aside from controllable lifestyle, income is another influencing factor that is seen in other studies as well. The specialty-related factors for selecting anesthesiology included controllable lifestyle/flexible work schedule (EOI of 53.00%), career opportunities (EOI of 44.00%), workload (EOI of 37.99%) and training length (EOI of 32.30%). (3,20,23)

Gender bias exists when it comes to choosing specialty for training as shown in multiple studies. Studies by AlKhilawi, Dossajee and Khader showed that females tend to choose anesthesiology more than males. Females tend to select specialties such as anesthesiology, pediatrics, obstetrics and gynecology and radiology. Males lean more into specialties such as surgery, internal medicine and orthopaedics (4,5,15). In this study, the respondent's demographics did not significantly influence the choice of anesthesiology as one of the top three preferred specialties.

Positive influence during clerkship is also an influencing factor for a student to choose anesthesiology as a career. In a study by Robertson et. al, shadowing and mandatory rotation were almost equally chosen (94 and 90 responses, respectively) as the preferred methods to learn more about anesthesiology (22). Career choices are usually made during medical school, that can change over time as the students progress into their medical education. Exposure to a specialty during clerkship encourages students to learn more about the specialty, increases awareness of the range of the specialty and provides hands-on experience regarding the needed skills to be successful in that specialty. In this study, 46 out of 54 respondents who picked anesthesiology as one of their top three preferred

specialties chose positive influence during clerkship as one of the influencing factors, and it is significant. The mandatory clinical rotation of the students in the Department of Anesthesiology consists of daily lectures/case discussions/ conferences, exposure to anesthesia induction and maintenance inside the operating room, essential pain management workshop and demonstration of skills such as intubation using mannequins. Feedback from the students showed that interactive lectures, operating room exposure and the essential pain management workshop were the most enjoyable part of their rotation, while the on-call nature, few number of cases observed, less patient interaction and short duration of rotation were found to be the least enjoyable.

Influence from a mentor or family members is cited as one of the influencing factors. In a study by Edem et. al (17), one-third or 30% of the respondents were influenced by a mentor or a family member regarding their choice of specialty. Another similar study showed that two-thirds of the respondents who have a positive role model during the clinical rotation was significantly associated with a career intention towards anesthesiology. In this study, influence from a mentor or a family member is not an influencing factor for choosing anesthesiology as a top three preferred specialty.

The respondent's decision to pursue anesthesia is also an influencing factor. Decision to pursue anesthesiology before and after clinical rotation are factors that affect inclusion of anesthesiology in their top three preferences. In a study by Bland et. al, forty-one (41%) of students reported making their decision after or during the third year in medical school. Of these, 20% made the choice in the fourth year and approximately 14% made their respective specialty choice before entering medical school (6). In this study 12 respondents or 8% were already decided for or not choosing anesthesiology even before their anesthesiology rotation started, while 23 respondents (15%) who were inspired to consider anesthesiology as a career actually chose anesthesiology as one of their top 3 preferences for specialty.

## CONCLUSION AND RECOMMENDATIONS

The following factors influence the choice of anesthesiology as a top three preferred specialty as a career: personal interest, positive influence during clerkship, income, enough time for leisure activity, and short length of training. As such, to encourage more medical graduates to pursue specialty training in anesthesiology, their clinical rotation in the department should leave a positive and lasting experience for them, including more participation during lectures, exposure in the operating room and during duty hours.

The limitation of this study is that it is a cross-sectional study and also due to the limited number of respondents. A prospective cohort study following a batch of medical students from their first year in medical school up until internship would be better to observe their career preferences through time.

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# Knowledge, Attitude And Perception Of Filipino Parturient Women Towards Labor Analgesia*

Erlyn Joy C. Valenzuela, MD[1]


## ABSTRACT

### Background and Objective of the Study

Painful labor produces maternal physiological changes that may affect maternal and fetal wellbeing. Little is known about whether parturients would be amenable to labor analgesia. The objective of this study is to investigate the knowledge, utilization and preferences of methods of pain relief in labor by expectant mothers in order to design a labor analgesia program.

### Methodology

This is a cross sectional study wherein 278 parturients were requested to complete a researcher-administered survey following informed consent to assess the knowledge, attitude and perception regarding labor analgesia and to estimate the correlation of awareness and acceptability with demographic variables. Statistical analysis was done using IBM SPSS V17.01 using 5% margin of error and 95% confidence interval. A p-value of <0.05 is considered to be significant to the study.

### Results

Most of the patients (n = 199, 71%) were unaware of labor analgesia. When the option of labor analgesia was offered only 36% (106) accepted it. Among them preference of the method of labor analgesia was treating doctor to take the decision regarding the pain alleviation method in 59 (55%), epidural in 29 (27%), 10 (9%) preferred spinal anesthesia. Among 172 (77%) who refused labor analgesia, the most common reason for refusal was it is harmful to the baby (26%) followed by the reason that they want to experience natural child birth (18%).

### Conclusion

Knowledge and acceptance of labor analgesia was significantly less in antenatal women, irrespective of age, parity, occupation or religion in our study group. The most significant reason for refusal of labor analgesia was because it is thought to be harmful to the baby. A graduate level of education, an urban background or a previous surgical experience had a positive impact on the knowledge and acceptance of labor analgesia.


## INTRODUCTION

### Background of the Study

Although a happy and meaningful experience, childbirth is one of the most challenging occurrences encountered by women during their lives. Painful labor produces maternal physiological changes that may affect maternal and fetal wellbeing. The maternal catecholaminergic surge in norepinephrine and epinephrine in response to labor pain increases maternal oxygen consumption, which may lead to incoordinate uterine action, consequently causing decreased placental perfusion. In some cases, increased maternal oxygen consumption may be deleterious to maternal and fetal health. In addition, maternal hyperventilation in response to labor pain causes adverse effects such as reduced fetal oxygen delivery. Besides these acute maternal and fetal hemodynamic and metabolic responses, intense labor pain has been correlated with the development of postpartum posttraumatic stress, postpartum depression, and persistent pain. [1]

An array of regional nerve blocks, systemic analgesic, and nonpharmacologic techniques

*2nd Place, 2020 Philippine Society of Anesthesiologists Inc. Research Contest Presentation

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are currently used for labor analgesia. Nonpharmacologic methods are commonly used, but the effectiveness of these techniques generally lacks rigorous scientific study. Neuraxial labor analgesia, most commonly epidural or combined spinal-epidural, is the most effective method of pain relief during childbirth, and the only method that provides complete analgesia without compromising the, muscular tone, and pressure sensation. Current techniques commonly combine a low dose of local anesthetic with a lipid soluble opioid. Neuraxial analgesia does not increase the rate of cesarean delivery compared to systemic opioid analgesia; however, dense neuraxial analgesia may increase the risk of instrumental vaginal delivery. [2]

Giving an epidural analgesia is said to be beneficial by improving patient care outcome and this far outweighs the benefits than the risk. It was stated that epidural analgesia not commonly received by immigrant women in western countries that may be due to racial origin [3]. Asian women were unlikely to receive epidural analgesia in comparison with non-Hispanic white women in the western countries that may be due patient's preference which has a major role in their decision-making [4]. In developing and low-income countries, labor pain relief utilizations were low and not routinely practiced [5-6].

## Significance of the Study

In the Philippines, especially in government hospitals, the laboring mother seldom receives interventions to reduce pain.[7] Epidural labor analgesia is the gold standard and ideal method in providing pain relief during labor and delivery [5]. Despite its advantages, it is not completely accepted and practiced in many developing countries.

In the Philippines, practice and concepts of obstetric anesthesia are hindered by several beliefs and perceptions. In 2003, approximately 3,150 spontaneous vaginal deliveries were attended in the Charity Service of the Philippine General Hospital, which is a good representative of obstetric cases done in a tertiary hospital in Manila. Out of these vaginal deliveries, only 1,100 mothers (35%) were given some form of analgesia during labor. In the private admissions, 86% to 90% of patients (n=693) get analgesia in various forms. [8] In the University of Santo Tomas Hospital, in year 2015, there were 148 private and 40 clinical patients, who were given labor analgesia. Comparatively, in the year 2016, 163 private and 21 clinical patients were given labor analgesia by an anesthesiologist. With this disparity at hand, a questionnaire to assess knowledge, attitude and perception (KAP) on labor analgesia has been made. As more expectant mothers become aware of the possibility of pain-free labor, linked to their rights to improved quality of obstetric care, their expectations for the use of pain relief agents during labor and delivery is bound to increase. The type, safety and effectiveness of pain relief agents would also become important topics for women and their families. However, little information is available on what women know about pain relief agents and even less information is available to women about the choices available to them. This study hopes to raise conversations on the perspectives of expectant mothers on pain relief utilization in labor. It primarily seeks to investigate the knowledge, preferences and utilization and of pain relief agents in a cohort of antenatal women.

## Objective of the study

To investigate the knowledge, attitude and perception of parturients towards labor analgesia.

## Specific Objectives:

1. To measure the following factors among parturients:
   a. knowledge of labor analgesia
   b. attitude towards labor analgesia
   c. perception towards labor analgesia

2. To compare the measured factors by:
   a. age
   b. religion
   c. educational status
   d. parity
   e. income
   f. occupation
   g. residence
   h. previous surgery

## Review of Related Literature

### Knowledge and Awareness

The patient's knowledge on labor pain is one of the main factors for diagnosing correct pain etiology, in order to have the proper pain management in achieving the best pregnancy outcome [11]. In the western countries, minority patients and low literacy contributes to the disparity on knowledge of labor analgesic options[12]. This may be due to their socioeconomic status, educational background and said to have a traditional mentality [3]. In studies, the knowledge of Asian Women on labor analgesia is low to moderate with only about 47% was exposed to epidural analgesia and 9.5% knows about labor analgesia [13-15] (table 1). The source of information is an important factor for their understanding regarding labor analgesia. Most of the source of their information is from friends and relatives and next is from media or readings (table 2). However, some of the participants obtain their information from antenatal clinics or previous experiences. Level of awareness is high and this is attributed to increasing discussion in antenatal health talks. The ambivalence and refusal of the providers are seen in areas with low resource setting [6]. The method of giving labor analgesia, about 53.3% knows it was given by epidural and others describe it as lower back injections (table 3). As with their understanding on the effectivity of epidural analgesia for labor about 42.3% believe that it works but the others about 52% seems not (table 4). [13-16]

Table 1. General Knowledge on Labor Analgesia

| Study ID | Yes | No |
|---|---|---|
| Naithani 2011 | 9.5% | 90.5% |
| To 2007 | 47% | 53% |

Table 2. Source of Information on Labor Analgesia

| Study ID | media or readings | antenatal clinic | friends or relatives | previous Labor |
|---|---|---|---|---|
| Mohamed 2013 | 13% | 8% | 42% | 18% |
| Naithani 2011 | 42.11% | - | 42.11% | 15.79% |
| To 2007 | 24% | 31% | 46% | 13% |

Table 3. Method of Labor Analgesia

| Study ID | Epidural | IM/IV | Lower Back injections | others |
|---|---|---|---|---|
| Mohamed 2013 | 53.3% | - | - | 46.7% |
| Naithani 2011 | 10.52% | 15.79% | 52.63% | 21.05% |
| To 2007 | 16% | 7% | - | 76% |

Table 4. Effectivity of Labor Analgesia

| Study ID | Yes | No | Others |
|---|---|---|---|
| Mohamed 2013 | 42.3% | 20.7% | 37.3% |
| To 2007 | - | 52% | 48% |

### Attitude

Attitude is a significant predictor that influences once use of epidural analgesia [17]. Asian women, whether in western countries or not, the attitude towards labor analgesia is influenced by woman's upbringing, culture, ethnic group, age and peer pressure. This attitude is also largely influenced by their access to knowledge and availability of labor analgesia [5]. With their poor knowledge on epidural analgesia most of them will not take it or undecided [13-15]. However other showed an impartial result regarding labor analgesia, about 32 % will accept, 34.9% will not and 33.1% were undecided [16-17]. The most reason for this, most pregnant women wanted to experience natural birth about 74.03%, for they believe that birth process for years without the any intervention. The other factors with this attitude are due to the advised of relatives and friends, and partner's preference. The stage of pregnancy the parturient is in affects their decision, for usually parturient attitude in the late part of pregnancy more clearly predicts the events of labor [17].

Fears and misconceptions contribute to the portion of patients on availing the labor analgesia. In Manila, Philippines with year 1980's, fear is said to be the most important cause in the slow progression of obstetric anesthesia in general. However, gradually the beneficial effects of epidural analgesia were introduced [18].

### Perception

In traditional mentality, it states that pain in labor is usually considered a positive feature of labor, the idea of relieving it is opposed, and this said to denote the successful bonding with the baby. However it also stated that better education has better understanding of the birth process and about pain relief in labor. [12, 14]

The use of epidural analgesia was associated with significantly less pain as expressed postnatally. There was a better overall experience of labor and majority are satisfied and it stated that it is the most effective and safe option [13]. Many women were perceptive in accepting the labor analgesia after counseling with health care providers. In the Philippines, it was noted by 2013, about 95% of the live births received antenatal care from a skilled provider. This leads to further discernment among Filipinos.[19]

### Asian Women on Labor Analgesia

In Systematic Review done last 2015, was done to determine the KAP on labor analgesia of Asian Women as there were no studies done in Filipino women. By knowing these parameters, it can help in better care and approach to our parturient patients. The results showed that the knowledge and awareness of Asian women regarding labor or epidural analgesia is relatively low to moderate (9.5 to 47%), with a high GRADE level of evidence. The perception and attitude of Asian women toward using labor or epidural analgesia in the studies is said to be influenced by traditional values and past experiences, and most most of them will not take it and undecided, with a moderate GRADE level of evidence.[14]

## METHODOLOGY

### Study Population

The questionnaires were administered to prenatal parturient women in their 2nd and 3rd trimester and those for vaginal delivery after cesarean. The patients that were excluded were those who had previous cesarean section and planned cesarean section for the succeeding pregnancy, multiple gestations, teenage pregnancy, and still birth. The study secured approval from IRB as well as from the Department of Obstetrics and Gynecology in gathering participants at the out-patient clinics during clinic hours from their patients, coming from University of Santo Tomas Hospital Private and Clinical Division.

### The KAP Questionnaire

The questionnaire was adapted from the 9-item Knowledge Attitude Perception (KAP) Questionnaire toward labor analgesia developed by Naithani U, et al (2011) for Indian antenatal women. This questionnaire underwent a face validation by the review of 3 experts on the field of labor analgesia in a study by Roldan in 2017.

#### Questionnaire Translation

The 9-item KAP questions on labor analgesia and demographic characteristics was translated to Filipino from the validated English version by a Filipino teacher, Ms. Zendel Rosario Taruc, PhD. This was then back translated by an English Teacher, Ms. Evalyn Abiog, PhD.

#### Face Validation

The Filipino version of the KAP questionnaire was reviewed by 3 experts on the field of labor analgesia. The experts certified that the 9-item question can measure the KAP towards labor analgesia of Filipino women.

#### Reliability Testing

The validated Filipino Translated questionnaire answered by 21 patients, with a power of 91%, showed an overall Cronbach's alpha of 0. 6463. This signifies that the questionnaire has an acceptable reliability in assessing the KAP on labor analgesia.

The 9-item KAP labor analgesia questionnaire may be divided into three domains: knowledge, attitude and perception. Questions 1-4 pertains to attitude on labor pain, questions 5-8 pertains to knowledge on labor analgesia, and question number 9 to perception. The domains on knowledge and attitude had an acceptable reliability with Cronbach's alpha of 0.7023 and 0.6655, respectively. The alpha for perception could not be computed since the domain had one question.

### Sample size

OpenEpi was used to calculate the minimum sample size of the study. Specifying a design effect of 1, margin of error equal to 5%, proportion equivalent to 50%, and finite population of 1000, the minimum sample size required is 278.

### Sampling methodology

The study employed a convenience sampling design to select study participants.

### Questionnaire administration

The study was conducted at the University of Santo Tomas Hospital and participants were gathered at the out-patient clinics during clinic hours coming from the Department of Obstetrics and Gynecology.

Parturient women who are lined-up in the Obstetric and Gynecologic Department were requested to complete the researcher-administered survey following informed consent. The participants were approached by an Anesthesiology resident where discussion of the study was made.

Eligible patients were asked to answer the questionnaire after discussing the study, showed their willingness to participate in the study, have read and signed the written informed consent, before or after their prenatal pre-natal visit.

After the parturients have read the survey, a study investigator was always available to assist participants in completing the survey and to clarify any questions that arose. The survey consists of two sections. The first section examines demographics, (age, religion, education level, parity, occupation, residence and previous caesarean delivery). The second section consists of questions, and assesses knowledge and options of labor analgesia, sources of information and perceptions on labor analgesia. Among those with a previous experience of delivery, participants were asked to score their previous pain experience using the numeric rating score. On average, each survey took about 5-10 minutes. Each question expresses only one idea (i.e., no questions contained "and") and no questions were phrased in a negative form. Answer types included choosing from a menu of choices, yes/no/neutral, or pains scores on a scale of 0 to 10 (not and).

### Data analysis

All data gathered were encoded in MS Excel. Each item was presented in frequencies or percentages.

Statistical analysis was done using IBM SPSS V17.01 using 5% margin of error and 95% confidence interval. A p-value of $<0.05$ is considered to be significant to the study.

## ETHICAL CONSIDERATIONS

This study was conducted in accordance with the Declaration of Helsinki and good clinical practice.

### REC Approval and Informed Consent

The study commenced upon the approval of the University of Santo Tomas Hospital Research Ethics Committee.

Participants were approached at the University of Santo Tomas Hospital's out-patient clinics. Consent were secured from participants at the Department of Obstetrics and Gynecology outpatient clinics where answering of the questionnaire were done. The participants were approached by an Anesthesiology resident where discussion of the study was made. No subject was able to participate in this study without written documentation of informed consent. The principal investigator informed the participants of their right to refuse to participate or withdraw from the study. The parturient participation in the study is completely voluntary and free from coercion. The principal investigator was the one to administer the questionnaire to the participants. No faculty

member of the Department of Anesthesiology was involved in the recruitment and data collection process.

### Data Safety and Confidentiality

To ensure privacy, confidentiality and anonymity, the patient's identifying information, i.e. names, address, hospital number, admission number, email address, as well as names of physicians and other health care providers, were not collected or the study cannot link individual responses with participants' identities. The study did not collect identifying information of research participants unless it is essential to the study protocol. However, the age, gestational age, parity, religion, residence (urban or rural), occupation and education are essential parts of the objectives and therefore were included in data gathering. Instead, each patient were assigned a code (year-month-patient number), example 15-03-01. These assigned codes were encoded in the Excel form which is stored with security codes and password. Information about research projects is separate from information about routine clinical care. Informed consent from the patients were obtained in which prior to taking part in this study; they agreed to take part in answering the survey questionnaire.

### Compensation

No compensation was given to the participants.

### Benefits

The women in labor may be enlightened on the benefits of having labor analgesia for her and the child by explaining to the mother that labor pain is a stress that has an effect also to the baby by leading to a decrease in placental perfusion, uncoordinated uterine activity, and dysfunctional labor. The labor pain may be controlled with labor analgesia which gives maternal satisfaction and better outcome for the baby. This is consistent with promoting the life and health of the mother and fetus. The possibility of providing access to counseling for the woman about these issues were part of this discussion. It will be also explained that their participation may help in to further the care of pregnant women with labor analgesia.

### Risks and Inconveniences

Pregnant patients are considered part of the scientifically complex research subjects base from the workshop done by NIH Office of Research on Women's Health last 2010. These patients has a combination of physiologic and ethical complexity. The ethical complexity is shown with the considerations in the need to balance the interests of the pregnant woman and the fetus. Pregnant women have the same capacity for autonomous decision making as their nonpregnant counterparts, including decisions regarding whether or not to participate in appropriate research studies. These were maintained and given to the research participants. The wellbeing and care of the woman who is pregnant and of her fetus always takes precedence over research considerations. Research involving the woman may affect the fetus, and research involving the fetus will affect the woman. Maternal and fetal risks are deeply interconnected, and consideration of enrolling pregnant women in research requires balancing the risk of fetal harm with the potential for benefit and the importance of the information to be gained on the health of women and fetuses. The risks and benefits to each were carefully considered in every case, and discussed with the woman. There are no entailed physical, social, legal and economic risks in this study but a minimal psychological risk may be involved due to learning on labor analgesia may affect their perspective.

### Discontinuation

Any subject who previously consented may choose to withdraw from participation at any point during the study.

## Conflict of Interest

No potential conflicts of interest have been identified. The principal investigators and co-investigators report no disclosures. No external funding has been received for this study. The primary investigator shouldered all expenses incurred.

## RESULTS

During the study period, a total of 278 parturients were recruited in this study who attended antenatal clinic at the Out Patient Department of University of Santo Tomas Hospital. The parturients were mostly on the 30-40 age group (45%), with single parity in 96 (35%) and multiple parity in 182 (65%). Most of the patient were Catholic 163 (59%) and employed 142 (57%). Their economic status was above poverty line with income of under 40,000pHp (68%) and they were in the third trimester of pregnancy (49%). The educational status of the study population showed an education up to graduation in 45% (126). [Table 1].

| Attribute | Frequency (n) (278) | Percentage (%) |
|---|---|---|
| **Age group** | | |
| <20 | 27 | 9.71 |
| 20-30 | 118 | 42.45 |
| 30-40 | 126 | 45.32 |
| >40 | 7 | 2.52 |
| **Religion** | | |
| Catholic | 163 | 58.63 |
| Iglesia ni Cristo | 26 | 9.35 |
| Christian | 72 | 25.9 |
| Baptist | 17 | 6.2 |
| Islam | 0 | 0 |
| Jesuit | 0 | 0 |
| **Educational Status** | | |
| Primary | 2 | 0.72 |
| Secondary | 58 | 20.87 |
| College Undergraduate | 92 | 33.09 |
| College Graduate | 126 | 45.32 |
| Post Graduate | 0 | 0 |
| **Civil Status** | | |
| Single | 3 | 1.08 |
| Common Law Wife/With Partner | 82 | 29.5 |
| Married | 178 | 64.03 |
| Separated | 15 | 5.39 |
| Annuled/Divorced | 0 | 0 |
| **Parity** | | |
| Primipara | 96 | 34.53 |
| Multipara | 182 | 65.47 |
| **Weeks of Gestation** | | |
| 20-28 weeks | 47 | 16.91 |
| 28-37 weeks | 138 | 49.64 |
| 37-42 weeks | 91 | 32.73 |
| greater than 42 weeks | 2 | 0.72 |
| **Income** | | |
| under 40,000/month | 189 | 67.99 |
| 40,000-59,999/month | 87 | 31.29 |
| 60,000-99,999/month | 2 | 0.72 |
| 100,000-249999/month | 0 | 0 |
| 250,000 and over/month | 0 | 0 |
| **Occupation** | | |
| housewife | 97 | 34.89 |
| employed | 142 | 57.08 |
| self employed | 39 | 14.03 |
| **Residence** | | |
| rural | 110 | 39.57 |
| urban | 168 | 60.43 |
| **Previous Surgery** | | |
| None | 233 | 83.8 |
| Yes | 45 | 16.19 |

***Table 1. Demographic and obstetric characteristics of respondents***

Women were inquired about the cause and severity of any past experience of severe pain and asked to grade it using 0-10 visual analog scale (VAS), most women graded it at 1-3 (52%); 4-6 (45%) or 7-10 (2%). Ninety-six (34%) of women had no past experience of labor pains while majority of the rest graded previous labor pain as grade 4-6 (41%). Expected labor pain of the present pregnancy was graded by the majority as 4-6 (51%) or 1-3 (47%). If asked about their attitude towards labor pain, 153(55%) expressed confidence. [Table 2].

| Past Experience of Severe Pain | | | Previous Labor Pain Score | | | Expected Labor Pain | | | Attitude Towards Labor Pain | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Score | No. of Patients | % | Score | No. of Patients | % | Score | No. of Patients | % | | No. of Patients | % |
| 0 | 0 | 0 | 0 | 96 | 34.53 | 0 | 0 | 0 | Confident | 153 | 55.04 |
| 1-3 | 145 | 52.16 | 1-3 | 57 | 20.50 | 1-3 | 131 | 47.12 | Fear | 49 | 17.63 |
| 4-6 | 126 | 45.32 | 4-6 | 116 | 41.53 | 4-6 | 142 | 51.08 | Anxious | 76 | 27.34 |
| 7-10 | 7 | 2.52 | 7-10 | 9 | 3.24 | 7-10 | 5 | 1.80 | | | |

***Table 2: Distribution of cases on the basis of score given to past experience of severe pain, previous labor pain and expected labor pain using VAS***

One hundred and ninety-nine (71%) women were unaware about labor analgesia. Among 79 (28%) women who were aware about labor analgesia, forty-four (55%) knew that it was provided by injection in the lower back termed as 'epidural or spinal' and twenty-three (29%) via IV injection. 59% (45 / 79) described the provider of labor analgesia to be an anaesthesiologist and twenty-nine (36%) by any doctor. Majority of the source of information were from friends and relatives (69%). [Table 3]

**Table 3. Characterization of respondent's access to information about pain relief in labor**

| Knowledge of labor analgesia | | | Methods of Labor Analgesia | | | Source of Information About Labor Analgesia | | | Provider of Labor Analgesia | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | | n | % | | n | % | | n | % |
| Yes | 79 | 28.42 | Acupuncture | 0 | 0 | Previous Labor | 15 | 18.99 | Operating Surgeon | 5 | 6.33 |
| No | 199 | 71.58 | Epidural Analgesia Spinal Anesthesia | 44 | 55.7 | Friends and Relatives | 55 | 69.62 | Nurse/compounder Any Doctor | 29 | 36.71 |
| | | | Deep Breathing Exercises/Lamaze | 9 | 11.39 | Media (Audio/Visual) | 6 | 7.59 | Anesthesiologists | 45 | 59.96 |
| | | | IV Injections | 23 | 29.11 | Printed Literatures | 3 | 3.8 | Do not Know | 0 | 0 |
| | | | IM Injections | 3 | 3.80 | Others | 0 | | 0 | | |
| | | | Do not know | 0 | 0 | | | | | | |

When the option of pain alleviation during labor was offered, only 36% (106) accepted it. [Figure 1] Among them, preference of the method of labor analgesia was treating doctor to take the decision regarding the pain alleviation method in 59 (55%), epidural in 29 (27%), 10 (9%) preferred spinal anesthesia. Among 172 (77%) who refused labor analgesia, the most common reason for refusal was it is harmful to the baby (26%) followed by the reason that they want to experience natural child birth (18%).

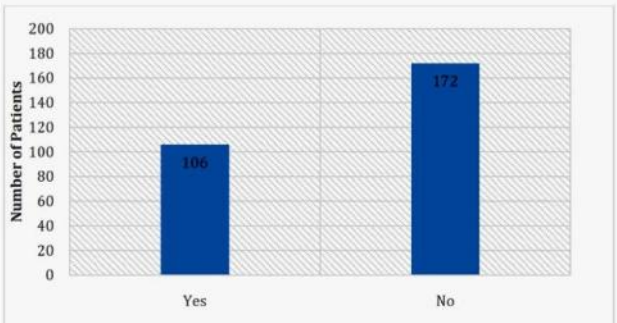


**Figure 1. Acceptance of labor analgesia**

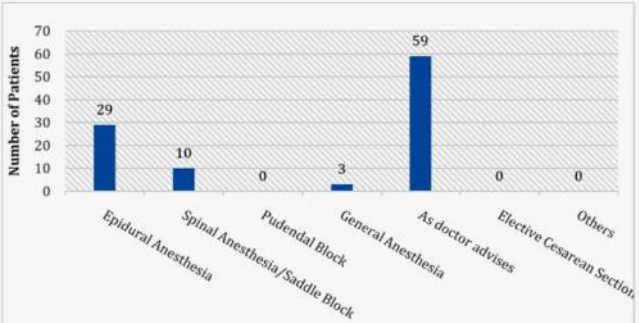


Figure 2. Source of Information Regarding Labor Analgesia

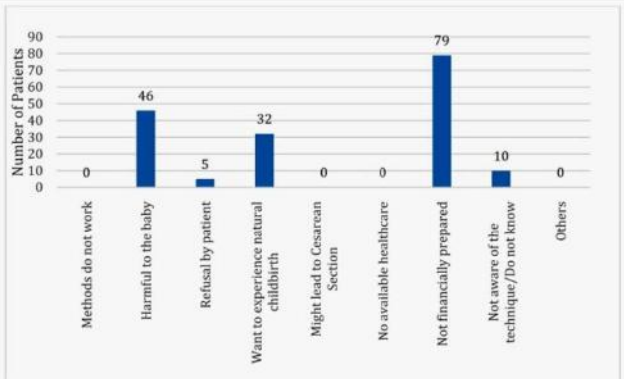


Figure 3. Reasons for Refusing Labor Analgesia

Women with an educational status of a graduate level had a positive impact on the awareness of painless labor (P = 0.046). The women who were graduates, urban, or had a previous surgery were found to have a significantly better knowledge regarding spinal and epidural as a method of labor analgesia (P = 0.046, P = 0.046, P = 0.024, respectively) and knowledge that the provider of labor analgesia was called the anaesthesiologist or any doctor. A significant source of information for graduates regarding labor analgesia was friends and relatives.

## DISCUSSION

An increasing number of women worldwide are using epidural analgesia as a pain management strategy during labor, but in our study, we found that only 28% of the women were aware of the availability of pain relief during labor; and when the option of painless labor was offered for their current pregnancy only 38% accepted it. The incidence of awareness and acceptance of labor analgesia from Nigeria (27 and 57.6%, respectively)[2] and Lagos (38.9 and 65.3%, respectively)[12] differ from Australia (98 and 80%, respectively).[3] This discrepancy in the level of awareness and acceptance could be attributed to the fact that child birth is still viewed as a physiological process in most of the developing countries, which is managed with as little interference as possible. Many women still do not know that pain of labor can be relieved.[13] The experience of pain in labor is unique for each woman[14] and the attitude toward labor may also be influenced by a woman's uprising, culture, ethnic group, age and peer pressure.[1] In some studies the past experience and expected labor pain were graded as high as 8.4 and many women were afraid and scared of labor pain,[4,13] while in our study the past experience or expected labor pains were graded as low as 4 to 6; and most of the women were confident that they could cope with the labor pains. It has been observed that in developing countries like India and South Africa,[13] antenatal education may be of even greater importance, as women may be less educated than women from the industrialized world and therefore, have a poorer knowledge of human reproduction. Furthermore, their ability to seek and access information is limited, so women are dependent on the education provided by relatives, friends,[1,3] and health workers.[13] They identified tablets and IV / IM injections as methods to provide pain relief in labor, few were aware of epidural or breathing exercise as methods of painless labor.[1,2,13] Use of intrapartum epidural analgesia is reported to vary considerably with the women's insurance status, race, parity, age and the specialty of the physician managing the labor. Race and lower socioeconomic status were seen as univariate predictors of refusal for epidural analgesia for labor; while full / part time employment, higher income, higher educational level, a prior educational program and knowledge about epidural were documented as univariate predictors of acceptance.[7,15] The degree of subjective pain, low parity and a high level of education were associated significantly with the acceptance of epidural labor analgesia.[2,14,16] In our study, except the graduate level of education, none of the demographic variables like age, religion, parity, occupation or background had improved awareness and acceptance of labor analgesia. This

implicates a general, low level of knowledge in all strata of society. Pain in labor is usually considered a positive feature of labor and the idea of relieving it is often opposed in developing countries. This reflects traditional values, according to which pain during labor denotes successful bonding with the baby. A girl child who is sensitized to such values during her growing period learns to accept and endure the pain of childbirth.[13] The educational level of our study population were mostly graduates and had a significantly better knowledge about labor analgesia (P = 0.046). This shows that women with better education can understand the birth process and have the ability to gather information about pain relief in labor and may gradually develop acceptance for it. It has been highlighted that healthcare providers in developing countries are either ignorant or consider educating women on pain relief methods during labor as a low priority issue. This apparent neglect is emphasized further by the observation that even women who had prior antenatal visits with obstetric healthcare providers did not have increased awareness.[2] In contrast, a recent study in a tertiary obstetric hospital of Australia[3] revealed that almost all women accessed antenatal information regarding intrapartum pain management, usually from multiple and varied sources. The vast majority of women were well-informed regarding their pain management in labor. They were more concerned with the maternal side effects than the fetal effects when deciding against pain management and this may be due to a greater awareness in their population that fetal side effects of epidural analgesia in general, are small. More women in Australia received information from an anaesthetist / obstetrician, while women in the United Kingdom received it from the media.

It is difficult to change the attitude and perception of the female population toward issues related to childbirth. Educational status does have a positive correlation with the acceptance of the methods for pain relief during childbirth. In the current scenario, even if pain relief during childbirth is offered, the poorly educated women are apprehensive and consequently refuse interventions. This reflects on our healthcare system, which is not geared up to provide sufficient cognitive and emotional preparation for childbirth. Considering the level of education in our population, dedicated childbirth educators could help in improving obstetric care, help in allowing women to make their own decisions regarding childbirth and also sensitize them to accessing analgesia in labor.

## CONCLUSION

The researcher conclude that knowledge and acceptance of labor analgesia was significantly less in antenatal women, irrespective of age, parity, occupation or religion in our study group. The most significant reason for refusal of labor analgesia was because it is thought to be harmful to the baby. A graduate level of education, an urban background or a previous surgical experience had a positive impact on the knowledge and acceptance of labor analgesia.

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# Perioperative Intravenous Lidocaine Infusion for Postoperative Pain Control in Open Nephrectomies at the National Kidney and Transplant Institute: A Randomized, Double-Blind, Placebo Controlled Trial*

**Emily Anne T. Fernando, MD[1]**


## ABSTRACT

***Background***: Postoperative Pain control in Open Nephrectomy is one of the leading concerns of patients who underwent the procedure. Many efforts were made to determine the most efficient concoction for pain control, and studies have shown that opioids were the most efficient in reducing pain; however, it was observed that these opioids would produce side effects which hinders the goals of Enhanced Recovery after Surgery (ERAS). Lidocaine Intravenous infusion on the other hand, has been introduced as an adjunct as an opioid sparing alternative. It has been reported that it is effective in managing pain in different types of surgeries with promising results.

***Objective:*** To determine the effectiveness of perioperative intravenous lidocaine infusion as an adjunct in postoperative analgesia in patients undergoing open nephrectomy.

***Methodology:*** This is a randomized, double-blind, placebo-controlled study among patients admitted at The Institution, who underwent Elective open nephrectomy. Randomization into two treatment groups was done via draw lots. Both groups received treatment 30mins prior to cutting time wherein induction of anesthesia using Midazolam 1mg IV, Fentanyl 50mcg/dose IV, Propofol 1% 1mg/kg IV, with sevoflurane were used and adjusted accordingly. Rocuronium 0.6mg/kg IV was used as muscle relaxant. During induction, Group A received Lidocaine 2% (200mg) diluted to D5W in a 50ml syringe and infused intravenously via Target controlled infusion (TCI) with a maintenance rate of 40mcg/kg/min infusion intra-operatively at the start of cutting time. On the other hand, Group B will receive PNSS in a 50ml syringe. Postoperative outcome measured for this study includes numeric pain scores at 1, 2, 12, and 24 hours post operatively, number of morphine rescue doses and presence of adverse drug reactions.

***Results***: Patients who received lidocaine had significantly lower mean pain scores across all time periods (7.6±1.2 at 1 hr, 3.4±1.3 at 2 hrs, 2.5±0.8 at 12 hrs, and 1.5±2.0 at 24 hrs) compared to those who received placebo (5.4±1.6 at 1 hr, 5.4±1.6 at 2 hrs, 4.9±1.1 at 12 hrs, and 3.5±1.5 at 24 hrs) (p-value=0.0021).

The mean pain scores of both groups significantly decreased starting from 1 hour to 24 hours after surgery (p-value=0.0000). Patients who received lidocaine had significantly lower mean number of rescue morphine (1.9±2.1) compared to those who received placebo (5.6±2.9) (p-value=0.0001). No patients had significant adverse reactions from the lidocaine group, while 6 patients (33.3%) had nausea from the placebo group (p-value=0.019).

***Conclusion:*** Peri-operative intravenous Lidocaine Infusion (IVLI) is effective in reducing post-operative pain during the first, second, twelfth and twenty-fourth hours after nephrectomy. Also, the administration of perioperative IVLI significantly lowered the number of needed rescue morphine.


***Keywords:*** *Intravenous Lidocaine Infusion, Pain Management, Open nephrectomy*

*3rd Place, 2020 Philippine Society of Anesthesiologists Inc. Research Contest Presentation*

[1]*From National Kidney and Transplant Institute, Quezon City*

## INTRODUCTION

Open Nephrectomy is a common surgical procedure at the Institution second only to the trending laparoscopic nephrectomies. In the annual reports from the Institution's Medical Records, A total of 242 and 212 open nephrectomies were done in 2016 and 2017 respectively. Due to the nature of the surgical approaches, specifically, flank incision (~8-10 inches) and lateral decubitus position, it encounters problems postoperatively such as: pain, delayed gastrointestinal function, nausea and vomiting, and prolonged hospital stay. Among these, postoperative pain is notorious and of great concern not only for the patients but for the surgeons and anesthesiologists as well. Numerous studies have been conducted to resolve this problem, hence adjunct medications were introduced and one of these medications is lidocaine.

Lidocaine is part of a multi-modal protocol designed to provide optimal perioperative care particularly in patients with abdominal surgery by maximizing perioperative pain control, reduce opiate requirements and adverse events. In fact, the Enhanced Recovery after Surgery (ERAS) protocol included lidocaine infusion as a good pain control agent and good opioid sparing adjunct.[1]

Lidocaine as Postoperative pain adjunct has not yet been established as part of the protocol for pain management practice at the Institution. Furthermore, the growing interest in some centers and several published international studies related to the efficacy of lidocaine has piqued the interest of the proponents of this study to provide better and safer post-operative pain control in open nephrectomy, and to provide local data for further related studies.

## SIGNIFICANCE OF THE STUDY

Post-operative pain is the major concern in open nephrectomies. The usual practice in this Institution for postoperative pain control in open nephrectomies are combined intravenous opioid infusion with or without epidural analgesia. While it may be effective in pain control, prolonged opioid use may result in several side effects including: Ileus, nausea and vomiting, urinary retention, respiratory depression, hyperalgesia and dizziness. This research aims to study the opioid sparing effect of lidocaine IV infusion as an adjunct in controlling postoperative pain. Upon searching at Pubmed, Clinical key and google scholar, no local studies have been published regarding continuous Lidocaine IV infusion. Thus, this study hopes to provide local factual data that may contribute in the advancement and influence the current practice of pain management at the Institution.

## REVIEW OF RELATED LITERATURE

Lidocaine is a local anesthetic, amide-type that works as a sodium channel blocker in neural tissues by interrupting neuronal transmission. It is a widely used local anesthetic that promotes anti-hyperalgesic properties that improves acute post-operative pain control.[2] Numerous studies supported intravenous (IV) lidocaine as an effective adjunct for opioid sparing use, and for pain control in chronic pain.[3] According to G. Lauretti, author of the Updated Journal for Mechanisms of Analgesia of Intravenous lidocaine, the differential action of intravenous lidocaine in central sensitization and the analgesic and cytoprotective actions of different doses of lidocaine IV is multifactorial. The central sensitization is secondary to a peripheral anti-hyperalgesic action on somatic and central on neuropathic pain which result on blockade of central hyperexcitability. It is noted too that IV lidocaine should not exceed the toxic dose of plasma concentration of 5mcg/ml.[4]

According to J, Adams et. al., on Emergency medicine: Clinical Essentials, the maximum dose of lidocaine is 4 to 4.5mg/kg but is increased to 7mg/kg when lidocaine is given with epinephrine. Signs of toxicity are dived into three levels, Mild (tingling and numbness in fingers and toes, light headedness, vertigo, tinnitus, metallic taste in mouth, and confusion), Moderate (nausea and vomiting, decreased hearing, tremors, hypotension, bradycardia, dysarthria) and Severe (Drowsiness, loss of consciousness, muscle twitching,

convulsions, cardiac arrhythmias and cardiac arrest). Therapeutic concentrations of lidocaine can be 5.5mg/L whereas a plasma level of 8-12mg/L and higher is associated with Central nervous system and Cardiorespiratory toxicity. In cases of lidocaine toxicity, The American Society of Regional Anesthesia and Pain Medicine recommends an initial bolus of 1.5mg/kg of 20% intravenous lipids followed by a continuous infusion of 0.25ml/kg/min., infusion of intravenous lipids can be doubled to 0.5ml/kg/min if cardiac stability is not restored. [5] Drug interactions that may affect the increase in serum levels of lidocaine are Cimetidine and Propanolol, Beta blockers with other anti-arrhythmics can increase cardiac depression. Phenytoin has additive cardiac effects, and Acetazolamide, Loop diuretics and Thiazides that cases hypokalemia may antagonize lidocaine.[6]

A. Kaba M.D. et al, on clinical investigations on IV lidocaine infusion noted that lidocaine has properties on analgesia, anti-hyperalgesia and anti-inflammatory which has been reported to speed the return of bowel function post operatively. [7]

Opioids

In modern medicine, opioids were discovered as the most potent pain killers used for perioperative and post-operative pain control. It is classified as natural, semisynthetic or synthetic opioids. Nociception and perception of noxious stimulus are modified by opioids in a manner that exerts its action in the brain, specifically the cortex and limbic system, affecting the cholinergic systems, resulting in changes in pain and arousal perception. Although opioids are potent and has good pain control properties, it can induce hyperalgesia, promotes tolerance and can cause numerous untoward side effects such as: Respiratory depression, nausea and vomiting, delayed gastric emptying, constipation, bowel distention, paralytic ileus, spasm of sphincter of oddi, urinary retention, histamine release, muscle rigidity, sedation, drowsiness, dizziness, light headedness and euphoria.[8] Opiates do not alter pain threshold of afferent nerve endings to noxious stimuli, nor do they affect the conductance of impulses along peripheral nerves. Analgesia is mediated through changes in the perception of pain at the spinal cord ($mu_2$, delta, kappa-receptors) and higher levels in the CNS (mu1, kappa3 receptors). There is no ceiling effect of analgesia for opiates. [9]

Morphine is a potent mu-opiate receptor agonist; Receptors include mu, kappa and delta.[10] Stimulation of mu-receptors produces analgesia, euphoria, respiratory depression, miosis, decreased gastrointestinal motility, sedation, somnolence, and physical dependence. [11] Kappa-receptors produces analgesia, miosis, respiratory depression, dysphoria and some psychomimetic effects. [11] There is no predictable relationship between morphine serum concentrations and analgesic response but may vary from patient to patient due to several factors: age, medical condition and emotions. There is no relationship between morphine concentrations and incidence of adverse events, although higher concentrations are associated with more adverse events. [12]

Flank Incisions are preferably used in uncomplicated open nephrectomies because this allows access to the retroperitoneum while avoiding the entry into the peritoneum. Post-Operative pain from flank incisions may be significant, especially during deep inspiration. Pain may be long term due to neuritis or entrapment of an intercoastal nerve in the suture or surrounding scar tissue.[13] The physiopathology of acute surgical pain is described by inflammatory cell infiltration which activates the pain pathways in the spinal cord and the reflexive muscle spasms. Inadequately controlled acute postoperative pain may result in chronic pain.[14]

## OBJECTIVES OF THE STUDY

### General Objective

The study is designed to determine the effectiveness of perioperative intravenous lidocaine infusion as an adjunct in postoperative analgesia in patients undergoing open nephrectomy.

### Specific Objective

1. To describe the socio-demographics and clinical profile of patients undergoing open nephrectomy according to the following characteristics:

a. Age
b. Sex
c. Height
d. Body Mass Index (BMI)
e. American Standard of Anesthesiologist (ASA) Classification

2. To compare the postoperative numerical pain scores during the first, second, twelfth and twety-fourth hour postoperatively for patients receiving lidocaine (Group A) versus the group given placebo (Group B).
3. To compare the total number and mean of rescue doses of opioid (Morphine) for patients receiving lidocaine (Group A) and Placebo (Group B).
4. To determine the mean dose of lidocaine given to patients in group A.
5. To determine safety of the drug through the proportion of patients with adverse drug reactions in both treatment arms.

## METHODOLOGY

### *Study Design*

This will be a prospective, randomized, double blind, placebo-controlled research. The anesthesiologist-in-charge and patients are not aware of the treatment. Only the investigator will know which treatment will be handed to the anesthesiologist. The participants of the study will be divided into two groups: Group A consists of the IV lidocaine infusion as the variable, and NSAIDs and Morphine as constants. Group B will be the placebo group, it consists of IV PNSS infusion as the variable and NSAIDs and Morphine as constants. Randomization will be done through a master list by listing the numbers 1 to 36, where in each number corresponds to either Group A or B. Patients will be randomly listed in the master list by draw lots, wherein a number will be drawn, and it will correspond to the number of the specific patient all throughout the study. Upon randomization, the anesthesiologist in charge will draw a number and that number will correspond to the treatment group. Only the Investigator will know the treatment group and will prepare the corresponding regimen. The investigator will also be responsible in keeping the master list.

### *Study Population*

The study participants are patients admitted at the Institution who will undergo an elective Open Nephrectomy procedure.

**Inclusion Criteria**

1. All patients who will undergo elective open nephrectomy
2. Age 18 to 60 years old
3. Male or Female
4. ASA I-III
5. Creatinine level: 0.6- 1.2mg/dL (males); 0.5-1.1mg/dL (females)

**Exclusion Criteria**

1. Patients diagnosed with Metastatic Renal Cell Carcinoma
2. Patients with cardiac Problems such as: arrhythmias, AV blocks, CAD, recent MI, heart failure
3. Patients with previous cardiac, hepatic and renal surgeries (I.e. angioplasty, CABG, Hepatectomy, liver and kidney transplant)
4. Patients with seizure disorders
5. Patients with electrolyte imbalance
6. Patients with liver diseases and cardio-renal problems
7. Patients with known lidocaine allergy
8. Patients on medications such as: Cimetidine, Propanolol, Anti-arrhythmic drugs, Phenytoin, Acetazolamide, Loop diuretics and Thiazides

**Patient Enrollment**

This research protocol was submitted to the Department of Anesthesia and the Institutional Review board. Patients will be recruited from both

Pay and Service, if they consented for the procedure.

**Enrollment Period**

Enrolment of patients in the study will be done a day prior to the proposed surgery during preoperative evaluation.

**Treatment Period**

Duration of the treatment period will begin on the day of the surgery and will terminate on the 24th hour post-operative day.

**Study Period**

The study will be conducted with a duration of 6-8months, from May 2019 to December 2019.

**MATERIALS AND METHODS**

**Sample Size Estimation**

This is a Prospective study which includes 36 subjects. Sample size needed for the study was computed using G-Power software for repeated-measures ANOVA with 4 time periods. Alpha was set to 0.05, medium effect size= 0.5, correlation = 0.7 and target power of 0.90. The resulting sample size is 36 or 18 per treatment arm.

| | | | |
|---|---|---|---|
| **F tests** – ANOVA: Repeated measures, between factors | | | |
| **Analysis:** | A priori: Compute required sample size | | |
| **Input:** | Effect size f | = | 0.5 |
| | α err prob | = | 0.05 |
| | Power (1-β err prob) | = | 0.90 |
| | Number of groups | = | 2 |
| | Repetitions | = | 4 |
| | Corr among rep measures | = | 0.7 |
| **Output:** | Noncentrality parameter λ | = | 11.612903 |
| | Critical F | = | 4.130018 |
| | Numerator df | = | 1.000000 |
| | Denominator df | = | 34.000000 |
| | Total sample size | = | 36 |
| | Actual power | = | 0.911505 |

**Method Sampling**

The study will include 36 adult patients, ASA I-III, ages 18 to 60 years old, scheduled for elective open nephrectomy under general anesthesia with continuous intravenous infusion of either lidocaine or placebo, depending which Group the patient was randomly assigned.

**Data Collection Procedure**

**A. Preoperative:**

An informed consent and patient information sheet will be given to all the research subjects who are going to participate in the study. This will include patient participants only.

**B. Intra-Operative:**

1. Patients of both arms will be hooked to the standard American Society of Anesthesiologists (ASA) monitors such as ECG, Pulse oximeter, ETCO2, and non-invasive blood pressure.

2. In Group A (Experimental group), treatment will start 30mins prior to cutting time. Induction of anesthesia will make use of the following: Midazolam 1mg IV, Fentanyl 50mcg/dose IV, Propofol 1% 1mg/kg IV, Volatile anesthetic: Sevoflorane maintained at least MAC 2 will be used and adjusted accordingly, and Rocuronuim 0.6mg/kg IV for muscle relaxant. Lidocaine 2% (200mg) will be diluted to D5W in a 50ml syringe, making a concentration of 4mg/ml will be used for infusion via Target controlled infusion (TCI) with a maintenance rate of 40mcg/kg/min. Infusion intraoperatively will start at cutting time. Rate will be decreased to 2mg/hr at the end of surgery and is continued at a constant rate of 2mg/hr until 24 hours post operatively via IV easy pump. Acetaminophen 1g IV will be given prior to cutting time. The medications will be prepared by the investigator prior to surgery and will be handled to the anesthesiologist in charge prior to induction. Syringes will be labeled as the number corresponding to the master list. No drug name will be placed on the syringe, but a standard dose preparation of 4mg/ml will be placed regardless if it is Group A or B.

3. In group B (placebo group), a 50ml syringe containing PNSS will be prepared and handled to the anesthesiologist in charge prior to induction. Treatment will start 30 mins prior to cutting time with the same induction of anesthesia as Group A regimen. Placebo continuous intravenous infusion will be used via TCI with the same maintenance rate of 40mcg/kg/min intra-operatively. Rate will be decreased to 2mg/hr at the end of surgery and is continued at a constant rate until 24 hours post-operation.

4. A standby 20% lipid intravenous solution will be prepared intraoperatively in case of local anesthetic toxicity would occur. An initial bolus of 1.5mg/kg followed by a continuous infusion of 0.25ml/kg/min. will be used for reversal of toxicity. Intravenous lipids can be doubled to 0.5ml/kg/min if cardiac stability is not restored.

**A. Post-Operative:**

A record sheet for numeric pain score will be provided for each patient. Frequency of rescue doses will be determined from the treatment sheet provided in the chart. Data obtained from PACU monitoring during the first two hours post-operatively, and 24 hours continuous monitoring will be noted. A standard opioid, Morphine at 1mg IV every hour as needed for pain will be used as rescue IV bolus, and a constant NSAID (Acetaminophen) of 1g IV every 6 hours round the clock will be given and Ketorolac 30mg IV every 8 hours round the clock for both treatment group.

During the entire course of the study, the incidence and the types of adverse events will be recorded and managed according to the standards of medical care. The following adverse events were to be noted namely: Nausea and/or vomiting, dizziness, hypersensitivity reactions, bradycardia, cardiac arrhythmias, hypotension, myocardial depression, restlessness, seizures, tachycardia, tremors or cardiac arrest. These will be assessed by the investigator who has knowledge on local anesthetic system toxicity (LAST). The nurse-in charge shall inform the investigator for occurrence of any of the above events. After assessment, appropriate treatment shall be given accordingly, and if deemed necessary, an immediate referral to other disciplines such as urology or internal medicine shall be made. If there are life-threatening adverse events, the patient's participation will be terminated, and appropriate interventions will be given. The occurrence of any adverse events shall be recorded by the investigator and noted in the data gathering sheet and will be reported to the Institutions' Adverse Event Committee.

**Definition of Terms:**

*ASA* - American Society of Anesthesiologist Classification

*Nephrectomy* - surgical removal of Kidney

*NSAID*- Non Steroidal Anti-inflammatory Drugs

*Arrythmias*- problem with rate or rhythm of heartbeat

*Bradycardia*- heart rate <60 beats per minute

*Tachycardia*- heart rate >100 beats per minute

*MI*- Myocardial Infarction (heart attack)

*CAD*- Coronary Artery Disease

*AV* Block- Atrio-ventricular block

*ETC02*- end tidal carbon dioxide

*LAST*- Local Anesthetic System Toxicity

*PACU*- Post Anesthesia Care Unit

## OUTCOME MEASUREMENTS AND DATA COLLECTION

**Primary Endpoint**

Numeric Pain Score- Measured ranging from 0= no pain, to 10= worst pain imaginable at 1, 2, 12, and 24 hours post operation. Pain will be standardized while patient is at rest at supine position.

**Secondary Endpoints**

1. Rescue Doses- Measured by the number of times the patient was given morphine intravenously from 0 to 24 hours post operation.

2. Adverse drug reactions- systemic toxicity such as light headedness, tinnitus and numbness of tongue and other rare but possible side effects that may be related to lidocaine include anaphylactoid reactions, bradycardia, cardiac arrhythmias, cardiac arrest, myocardial depression, respiratory arrest, restlessness, seizures, tachycardia and tremors. It shall be emphasized that the amount of drug used in this study is the maximum recommended dose to avoid systemic toxicity.

## DATA HANDLING AND ANALYSIS

All subjects enrolled in the study will be assigned with a number code (1-36). Each data will be recorded in a pre-designed research data collection form. The demographics and biomedical date of each patient will be encoded in Microsoft excel 2007, together with the baseline characteristics.

### Statistical Analysis

Descriptive statistics using frequencies and proportion will be used to summarize categorical variables (e.g. Sex, ASA classification, proportion of patients with adverse drug reactions). Mean and standard deviation will be used to describe quantitative continuous variables (e.g. Age, Height, BMI, Numerical pain scores, number of rescue doses of morphine).

Repeated measures of ANOVA will be used to determine if significant different exists in numerical pain scores between patients receiving lidocaine (group A) and the group given placebo (Group B) across the four time periods. T-test will be used to determine if significant different exists in the total number and dosage of lidocaine between patients receiving lidocaine (Group A) and the group given placebo (Group B). T-test will also be used to determine if there is significant difference in the number and dosage of morphine between the two groups. Test for homogeneity among groups will be done and Shapiro-Wilk test will be used to determine if outcome variables are normally distributed.

Finally, Chi-square test will be done to determine if there is significant difference in the proportion of patients with adverse drug reactions in both treatment arms. Significance level will be set at $p<0.05$ for all statistical analysis and Stata SE version 12 software will be used.

### Ethical Considerations

The study protocol was submitted to the Department of Anesthesia and the Institutional Review Board. The informed consent shall be explained in a dialect easily understood by the patient and will be done prior to patient enrollment. The study will be conducted in compliance with the protocol and regulatory requirements. Patient's name will not be disclosed, only their corresponding number will be shown in the data. All patients' data will be kept in confidentiality by the principal investigator, and if the patient would want to have a copy of their participation, they will be provided with a copy of their data only. No other parties will know the patient's name or initials to ensure anonymization, privacy and confidentiality.

The 24hrs monitoring of the patient will be done at the Recovery room post operation. Budget allocation for this was approved by the Ethics committee with study protocol number: R-2018-019 which allows to waive the recovery room fee of approximately Php 4,500 per patient.

## RESULTS

The mean age of the patients was 44.8 years old (SD=12.6). There is equal distribution of males and females in the study. The mean height was 160.2cm (SD=5.9) and mean BMI was 23.1 (SD=3.1). More than half of the patients were classified as ASA II (63.9%). All patient characteristics did not differ significantly between the two treatment groups.

| Table 1. Characteristics of Study Population | | | | |
|---|---|---|---|---|
| | Total (N=36) | Group A, Lidocaine n=18 | Group B, placebo n=18 | Independent T-test / Chi-square p-value |
| Age (mean, ± SD) | 44.8±12.6 | 45.3±12.3 | 44.3±13.2 | 0.8158 |
| Sex (n, %)<br>Male<br>Female | <br>18 (50.0)<br>18 (50.0) | <br>10 (55.6)<br>8 (44.4) | <br>8 (44.4)<br>10 (55.6) | 0.505 |
| Height in cm (mean, ± SD) | 160.2±5.9 | 160.8±6.3 | 159.6±5.5 | 0.5661 |
| Body Mass Index (mean, ± SD) | 23.1±3.1 | 22.5±2.3 | 23.7±3.8 | 0.2503 |
| ASA (American Standard of Anesthesiologists) Classification (n, %)<br>I<br>II | <br>13 (36.1)<br>23 (63.9) | <br>4 (22.2)<br>14 (77.8) | <br>9 (50.0)<br>9 (50.0) | 0.083 |

Patients who received Lidocaine had significantly lower mean pain scores across all time periods compared to those who received placebo (p-value=0.0021). The mean pain scores of both groups significantly decreased starting from 1 hour to 24 hours after surgery (p-value=0.0000).

| Table 2. Comparison of Postoperative Numerical Pain Scores Between Lidocaine and Placebo Group | | | | | |
|---|---|---|---|---|---|
| | 1 hour | 2 hours | 12 hours | 24 hours | Repeated-measures ANOVA (F-test, P-value) |
| Group A, Lidocaine (mean, ± SD) | 7.6±1.2 | 3.4±1.3 | 2.5±0.8 | 1.5±2.0 | Within groups: F=170.0, p-value=0.0000 |
| Group B, placebo (mean, ± SD) | 8.7±1.0 | 5.4±1.6 | 4.9±1.1 | 3.5±1.5 | |
| Independent T-test (p-value) | 0.0060 | 0.0002 | 0.0000 | 0.0028 | Between groups: F=10.0, p-value=0.0021 |

Patients who received Lidocaine had significantly lower mean number of rescue morphine compared to those who received placebo (p-value=0.0001).

| Table 3. Comparison of Use of Rescue Medications Between Lidocaine and Placebo Group | | | |
|---|---|---|---|
| | Group A, Lidocaine n=18 | Group B, placebo n=18 | Independent t-test (p-value) |
| Number of rescue morphine (Mean ± SD) | 1.9±2.1 | 5.6±2.9 | 0.0001 |
| Dosage of rescue morphine (Mean ± SD) | 1.9±2.1 | 5.6±2.9 | 0.0001 |

The incidence of ADR differed significantly between the two groups (p-value=0.019). No patients had nausea from the Lidocaine group while 6 patients (33.3%) had nausea from the placebo group.

| Table 4. Comparison of Occurrence of Adverse Drug Reaction Between Lidocaine and Placebo Group | | | |
|---|---|---|---|
| | Group A, Lidocaine | Group B, placebo | Chi-Square Test (p-value) |
| Occurrence of Adverse Drug Reaction (Nausea)<br>Yes<br>No | <br>0 (0.0)<br>18 (100.0) | <br>6 (33.3)<br>12 (66.7) | 0.019 |

## DISCUSSION

Among the different strategies that has been recommended for control of post-operative pain, intravenous lidocaine infusion (IVLI) gained the attention. The results of the current study supported the use of perioperative IVLI for management of post-operative pain. One strength of this study is the use of randomization to allocate patients into treatment groups which minimized selection bias. Performance and detection biases were also minimized by doing a double-blinded design. The use of a placebo-controlled trial wherein the patient characteristics were similar in both the treatment and placebo groups also strengthened the validity of the results and resolved the issue of possible confounding. The results were also consistent with previous studies which showed the effectiveness of IVLI.

Vigneault and colleagues (2010) presented an evaluation of effectiveness of the analgesic and its safety during general anesthesia. MEDLINE EMBASE, Cochrane and SCOPUS databases, with addition of grey literature, were used to perform the systematic review[16(12)] The review comprised of all randomized controlled trials that use placebo or any comparator and assessed IVLI throughout general anesthesia for any type of surgery (29 studies consisting of 1754 patients). The I2 index was used to assess heterogeneity and random effects models. Six hours after operation, IVLI decreased pain at rest (weighted mean difference [WMD]= -8.70, 95% confidence intervals [CI] -16.19 to -1.21), during cough movement (WMD= -11.19, 95% CI -17.73 to -4.65), and during movement (WMD= -9.56, 95% CI -17.31 to -1.80). There were also decreased opioid requirement (morphine) due to IVLI (WMD= -8.44 mg, 95% CI -11.32 to -5.56), time to first flatus (WMD= -7.7.62 hr, 95% CI -10.78 to -4.45), time to first bowel movement (WMD= -10.71 hr, 95% CI -16.14 to -5.28), nausea/ vomiting (risk ratios= 0.71, 95% CI 0.41 to 0.07). Incidence of cardiac and neurologic adverse events was comparable in the 12 studies that systematically screened adverse events. The authors concluded that IVLI is an anesthesia auxiliary throughout general anesthesia and has the capacity to improve post-operative analgesia and the effectiveness of care, primarily in the context of abdominal surgeries. IVLI safety cannot be established in the study given that it is linked with potentially serious adverse event and insufficient studies of adverse events evaluation. The authors recommended further research particularly on optimal dose treatment and intervention safety.[15]

More recently, a systematic review on the effectiveness of perioperative lidocaine infusion (IVLI) in postoperative pain and recovery in various surgery patients was done by Weibel et al (2016) consisting of 45 trials with 2802 participants. [20] Randomized controlled trials until May 2014 were searched in CENTRAL, MEDLINE, EMBASE, and CINAHL databases and ClinicalTrial.gov and congress proceedings for comparative studies of patients who did or did not receive continuous perioperative IVLI. Meta-analysis suggested that lidocaine decreased postoperative pain (visual analog scale 0 to 10 cm) at 1-4 hours (MD= -0.84, 95% CI -1.10 to -0.59) and at 24 hours (MD= -0.34, 95% CI -0.57 to -0.11) post-surgery, but not at 48 hours (MD= -0.22, 95% CI -0.47 to 0.03). Trial sequential analysis and subgroup analysis proposed decreased pain for abdominal surgery patients who underwent laparoscopic or open abdominal, but not for those who had other surgeries. Evidence were insufficient for positive effects of lidocaine on postoperative gastrointestinal recovery, opioid requirements, postoperative nausea and vomiting and duration of hospital stay. The authors concluded that there is limited evidence on intravenous lidocaine infusion when compared with placebo on pain scores, especially in the early phase of post-operation.[20]

## CONCLUSION

Peri-operative intravenous lidocaine infusion (IVLI) is effective in reducing post-operative pain during the first, second, twelfth and twenty-fourth hours after nephrectomy. Also, the administration of perioperative IVLI significantly lowered the number of needed rescue morphine post operation. It is considered safe as no adverse events were observed. Given this, the use of perioperative IVLI is highly recommended.

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## APPENDIX A

## DATA GATHERING SHEET

1. GENERAL DATA

| Patient No. | Patient Initials | Age | Sex | Weight (Kg) | Height (cm) | BMI (kg/m2) | ASA Classification |
|---|---|---|---|---|---|---|---|
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |

**PACU MONITORING SHEET**

| TIME FROM POST OP | PAIN SCORE | RESCUE DOSE(morphine) 1mg q1 prn | Additional Medications given if any | Adverse Effect |
|---|---|---|---|---|
| 1hr | | | | |
| 2hrs | | | | |
| 12hrs | | | | |
| 24hrs | | | | |

Total Amount of Morphine____

**Adverse Drug Reactions noted within 24 hours**: PUT A CHECK MARK FOR YES or NO and write the name of rescue medications and total dose given if indicated

| REACTIONS | YES | NO | NAME OF RESCUE MEDICATION/S (IF GIVEN) | TOTAL DOSE OF RESCUE MEDICATION/S (IF GIVEN) |
|---|---|---|---|---|
| NAUSEA | | | | |
| VOMITING | | | | |
| DIZZINESS | | | | |
| ANAPHYLACTOID REACTIONS | | | | |
| BRADYCARDIA | | | | |
| CARDIAC ARREST | | | | |
| CARDIAC ARRHYTHMIAS | | | | |
| MYOCARDIAL DEPRESSION | | | | |
| RESPIRATORY ARREST | | | | |
| RESTLESSNESS | | | | |
| SEIZURES | | | | |
| TACHYCARDIA | | | | |
| TINNITUS | | | | |
| TREMORS | | | | |

# Depression among Secondary Students in the Philippines: Assessing its Prevalence and Risk Factors

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## ABSTRACT

Depression among adolescents is a serious mental health problem that requires proper diagnosis and treatment. This study piloted surveys to screen secondary students for depression symptoms in selected regions in the Philippines. The study found that 47.87% of the 2,682 students surveyed showed signs of depressions—that is, students reported five or more depression symptoms based on the DSM-V diagnostic criteria for major depressive disorder over a two- week period and/or possible suicidalities. About 33.30% of students who reported depression symptoms also stated having suicidal ideations. The study found that high income can be a risk factor for adolescent depression in the Philippines because youth from high-income households face greater pressure in the high-pressure, performance-oriented, and hypercompetitive environments they live in. There were also more female secondary students who reported depression symptoms. The higher prevalence of depression symptoms among adolescent girls may be accounted for by female hormonal fluctuations and social and relationship patterns of girls, particularly the tendency of girls to co-ruminate. The study also found a higher prevalence of depression in the younger cohorts possibly due to the onset of puberty. Puberty may cause hormonal changes or transient impacts of social pressures, which are associated with risks of depression among adolescents.

## INTRODUCTION

Deemed as the prime cause of disability and a leading contributor to the overall burden of disease worldwide, depression affects more than 300 million people around the globe.[1]

Depression, which is different from feelings of being down or sad, is a mental disorder that causes people to suffer from depressed mood, loss of interest or pleasure, feelings of low self- worth, and difficulty of sleeping and poor concentration.[2] Left untreated, depression can lead to poor functional capacity or, at worst, suicide. Nearly 800,000 people worldwide die because of suicide each year.[3]

Depression debilitates millions Filipinos with the Philippines having the most number of depressed people in the Southeast Asian region. In 2015, around 3.3 million Filipinos suffered from depression. Suicide rates in the Philippines were estimated at 2.5 males and 1.7 females per 100,000.[4] These figures, the World Health Organization (WHO) suspects, may be underestimated since the stigma surrounding mental health issues could result in under-reporting of cases of depression and suicide incidents.

Teenagers and young adults are among the groups most at risk of depression. Suicide linked with depression is the primary cause of death among 15-29 year-olds worldwide.[5]

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[1] *World Health Organization. (2018). Depression: Key Facts. 22 May. Retrieved https://www.who.int/en/news-room/fact-sheets/detail/depression*

[2] *Mental Health Foundation. (2018). Depression. Retrieved https://www.mentalhealth.org.uk/a-to-z/d/depression*

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[4] *De Guzman, S. (2018). Mental health of Filipinos today. The Philippine Star. August 27. Retrieved https://www.philstar.com/opinion/2018/08/27/1846128 /mental-health-filipinos-today*

[5] *World Health Organization. (2018). Depression: Key Facts. 22 May. Retrieved https://www.who.int/en/news-room/fact-sheets/detail/depression*

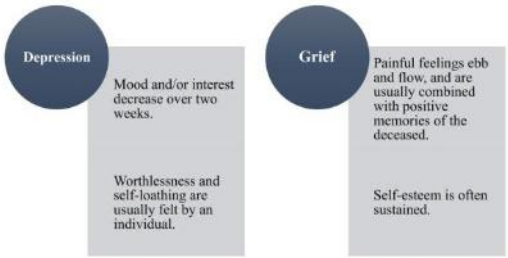
In the Philippines, 15% of students aged 13-17 attempted suicide one or more times and 9.2% seriously considered attempting suicide in the past 12 months prior to the administration of the WHO's 2015 Global School-based Student Health Survey.[6] Cases of young patients with suicidal tendencies or have attempted suicide have notably increased between 2016 and 2018, with at least one suicide referral made per day.[7]

Timely identification, treatment and management of depression among adolescents is imperative if depression is to be addressed effectively in the Philippines. The Community Pediatric Society of the Philippines and a leading pharmaceutical company in the Philippines have piloted surveys aimed at screening children and adolescent students for depression in selected regions. This report discusses the findings and implications that emerged from the surveys.

## Depression: Causes, Symptoms, and Treatment

Depression, also called major depressive disorder or clinical depression, is a mood disorder that negatively affects a person's feelings, thoughts and behavior. It can result in various emotional and physical problems and decreased capacity to function properly at work, home or school. Depression is different from feelings of sadness, grief or bereavement (Figure 1).

**Figure 1: Distinguishing between Depression and Sadness, Grief or Bereavement**




*Source: American Psychiatric Association (2018). What Is Depression?. Retrieved https:// www.psychiatry.org/patients-families/depression/what-is-depression*

Symptoms of depression could be mild or severe and must last at least two weeks to warrant a diagnosis of depression. Symptoms may include:

(i) feelings of sadness or depressed mood;
(ii) reduced or loss of interest or pleasure in activities previously enjoyed;
(iii) increased or reduced weight that is not linked with dieting;
(iv) sleeping too little or too much;
(v) increased fatigue;
(vi) greater engagement in purposeless physical activity such as hand-wringing or pacing;
(vii) slowed movements and speech;
(viii) feelings of worthlessness or guilt;
(ix) poor concentration or decision-making; and
(x) suicidal ideation and thoughts of death.[8]

The symptoms of depression in children and teenagers have slight differences to those of adults. Younger children suffering from depression may exhibit symptoms such as sadness, irritability, clinginess, physical aches and pains, refusal to attend school, or being underweight. These symptoms are also largely observed among teens in addition to poor performance and attendance in school, anger, feelings of worthlessness, use of drugs or alcohol, self-harm and little interest in social interaction.[9]

While depression is among the most treatable mental disorders, treatment initiation initiation remains sub-optimal as only around one-third of newly diagnosed patients get treatment.[10] Medication, psychotherapy, electroconvulsive therapy or a combination of these are used to treat depression. Around 80%-90% of patients with depression respond well to treatment.[11]

[6] *World Health Organization. (2015). Philippines: 2015 Fact Sheet. Global School-based Student Health Survey. Retrieved https://www.who.int/ncds/surveillance/gshs/PIH2015_fact_sheet.pdf.*

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[11] *American Psychiatric Association (2018). What Is Depression?. Retrieved https://www.psychiatry.org/patients- families/depression/what-is-depression*

## Screening Tool Description and Profile of Respondents

The Community Pediatric Society of the Philippines in collaboration with a leading pharmaceutical firm in the Philippines have developed and administered a screening tool for diagnosing depression among children and adolescent students. The tool is in the form of a survey questionnaire, which adheres to the DSM-V diagnostic criteria for major depressive disorder.[12] There are nine core symptoms of depression. Five or more need to be present over a two-week period to diagnose depression.

The 12-item questionnaire covered specific symptoms for depression in children and adolescents and major issues experienced during this period such as seeking approval/support from parents and peers. Students were asked whether or not they experienced such feelings and issues in the past two weeks prior to administering the survey. Students with a score of 5 and above were deemed to show signs of depression, while those who answered yes to any of the two questions relating to suicidal tendencies were deemed to have possible suicidalities. The survey questionnaire was written in English with a Filipino translation.

Between 2016 and 2018, the screening tool was piloted among students in grades 7-12 aged 13-20 in two public schools in the National Capital Region and Region VI and two private schools in Region IV-A.[13] The schools and students were selected using convenience sampling, which is most useful for pilot studies like this one. Most importantly, the convenience sampling method allowed for a crucial ethical consideration in undertaking health-related researches-that is, informed consent or the willingness of subjects to participate.[14] Since the schools are located in city centers and attract students from various geographic and socio-economic backgrounds, the study sample may be likely representative of the secondary student's populations in the National Capital Region, Region IV-A and Region VI.

The schools were selected based on the permission of school officials, enrollment size, diversity of students in terms of socio-economic background, and previous collaborative efforts with the partner pharmaceutical firm and the Community Pediatric Society of the Philippines. In each school, students in grades 7-12 were targeted, but only those with parental consent were allowed to take the survey.

The screening tool was administered to a total of 2,682 students. Since the surveys were conducted during the Philippines' transition to the K-12 program, the schools had a few or no enrollment for grades 11 and 12 (Table 1).

**Table 1: Study Population by Sample School**

| School | Number of Students (Grade 7-12) |
|---|---|
| Public School A (NCR) | 900 |
| Public School B (Region VI) | 810 |
| Private School A (Region IV-A) | 321 |
| Private School B (Region IV-A) | 651 |
| **Total** | **2682** |

Source: Study team's calculations.

About 47.25% of fathers of the students surveyed were employed in private organizations (Table 2). There were more students in public schools whose fathers were overseas contract workers compared with their counterparts in private schools. In contrast, there were more students in private schools whose fathers were engaged in their own income-generating activities such as businesses compared with students in public schools.

More than half, or 52.5%, of mothers of the students surveyed were housewives, while 32.35% of them were employed in private organizations (Table 3). Similar to fathers, more mothers of students in private schools had their own businesses or other income-generating activities than their counterparts in public schools.

**Table 2: Distribution of Study Population by Father's Occupation (%)**

| Employment Category | | Public School A (NCR) | Public School B (Region VI) | Private School A (Region IV-A) | Private School B (Region IV-A) |
|---|---|---|---|---|---|
| Wage and salary workers | Employed in government agencies | ... | 3 | 4 | ... |
| | Employed in private firms | 37 | 58 | 63 | 31 |
| Self-employed or owns a business | | 3 | 9 | 9 | 22 |
| Unpaid family workers (e.g. employed in family business) | | ... | ... | ... | 47 |
| Overseas Contract Workers | | 2 | 27 | 10 | ... |
| Unemployed | | 58 | 4 | 14 | ... |

Note: Total percentage may exceed 100% due to rounding up.
Source: Study team's calculations.

[12] *The criterion on psychomotor retardation or agitation was not included in the questionnaire because it needs to be observed by others and is therefore not applicable for a self-evaluation questionnaire.*

[13] *The names of the schools were withheld in view of ethical considerations of this study.*

[14] *Philippine Health Research Ethics Board. (2018). National Ethical Guidelines for Health and Health-Related Research. Taguig City*

**Table 3: Distribution of Study Population by Mother's Occupation (%)**

| Employment Category | | Public School A (NCR) | Public School B (Region VI) | Private School A (Region IV-A) | Private School B (Region IV-A) |
|---|---|---|---|---|---|
| Wage and salary workers | Employed in government agencies | ... | 2 | 9 | ... |
| | Employed in private firms | 30 | 44 | 36 | 19 |
| Self-employed workers or owns a business | | ... | 15 | 13 | 15 |
| Unpaid family workers (e.g. housewife) | | 70 | 40 | 34 | 66 |
| Overseas Contract Workers | | ... | ... | 8 | ... |
| Unemployed | | ... | ... | ... | ... |

Note: Total percentage may exceed 100% due to rounding up.
Source: Study team's calculations.

**Table 4: Distribution of Study Population by Religious Affiliation (%)**

| Religious Affiliation | Public School A (NCR) | Public School B (Region VI) | Private School A (Region IV-A) | Private School B (Region IV-A) |
|---|---|---|---|---|
| Evangelical Christianity | 10 | 30 | 33 | ... |
| Iglesia ni Cristo | 10 | ... | 2 | ... |
| Protestant | ... | ... | 7 | ... |
| Roman Catholic | 70 | 59 | 55 | 98 |
| Others | 10 | 11 | 5 | 2 |

* = Others include Aglipayan, Adventist, Methodist, Islam, etc.
Note: Total percentage may exceed 100% due to rounding up.
Source: Study team's calculations.

Table 5 presents estimates of prevalence of depression among students (in percentages) and 95% confidence intervals. Among the 2,682 students surveyed, 47.87% indicated signs of depressions-that is, students reported five or more depression symptoms over a two-week period and/or possible suicidalities. Given a 95% confidence interval, the study's best estimate of the overall prevalence rate of depression symptoms in the study population falls between 45.98% and 49.76%.

With nearly half of the study population reporting symptoms of depressions, the findings indicate a high prevalence of depression among young people. This highlights both the need and importance of detecting and treating depression as part of pediatric primary care. Detecting depression among teens and adolescents would be aided by assessments using standardized depressions screening tools such as the one used in this study. Follow-up consultations with physicians are needed to confirm the diagnosis. The high prevalence of depression symptoms among students in grades 7-12 could also reflect an increase in reporting of symptoms or help- seeking behavior given potentially greater awareness of mental health issues today.

**Table 5: Percentage of Students with Signs of Depression**

| School | Total | Students with Scores 5 and Above* | Students with Possible Suicidalities |
|---|---|---|---|
| Public School A (NCR) | 42.33 (39.10–45.56) | 10.67 (8.65–12.69) | 31.67 (28.63–34.71) |
| Public School B (Region VI) | 44.70 (41.28–48.12) | 13.20 (10.87–15.53) | 31.48 (28.28–34.68) |
| Private School A (Region IV-A) | 50.47 (45.00–55.94) | 20.25 (15.85–24.65) | 30.22 (25.20–35.24) |
| Private School B (Region IV-A) | 58.22 (54.43–62.01) | 18.89 (15.88–21.90) | 39.32 (35.57–43.07) |
| **TOTAL** | **47.87 (45.98–49.76)** | **14.58 (13.24–15.92** | **33.30 (31.52–35.08)** |

* = Given the nine core symptoms of depression, students reporting five or more symptoms over a two-week period
Source: Study team's calculations.

Among the secondary students in the four schools who reported depression symptoms, 33.30% stated having suicidal ideations. Past studies have shown that having some suicidal thoughts during early adolescence was not uncommon.[15] However, persistent suicidal ideation among early adolescents is not common and is a source of concern.[16] Among Swiss youth, for example, even transient suicidal ideation among pre-adolescents was linked with poor young adult outcomes.[17] This indicates that transient, and particularly persistent, suicidal ideation among adolescents serves as an early warning for preventing both current and future risk and adversity.

In the Philippines, approximately one in 10 Filipino youth aged 15 to 27 have suicidal thoughts- although only about 1 in 20 go through with suicide. In terms of the factors associated with suicide ideation and suicide attempts among Filipino youth, an adolescent's integration into his/ her family is significantly correlated with suicide. This emphasizes the important role of family members in looking after the mental health of youth.[18]

Table 5 also shows that there is a higher share of students reporting symptoms of depression in private schools at 54.35% than public schools at 43.52%. Moreover, there were more students in private schools reporting possible suicidalities

[15] *Garrison C., Addy C., Jackson K., McKeown, R., and Waller J. (1991). A Longitudinal study of suicidal ideation in young adolescents. Journal of the American Academy of Child and Adolescent Psychiatry; 30(4):597-603.*

[16] *Stoep, A., McCauley, E., Flynn, C., and Stone, A. (2010). Thoughts of Death and Suicide in Early Adolescence. Suicide Life Threat Behav; 39(6): 599.*

[17] *Steinhausen, H., and Metzke, C. (2004). The impact of suicidal ideation in preadolescence, adolescence, and young adulthood on psychosocial functioning and psychopathology in young adulthood. Acta Psychiatrica Scandinavica; 110(6):438-445.*

[18] *Quintos, M. (2017). Prevalence of Suicide Ideation and Suicide Attempts among the Filipino Youth and Its Relationship with the Family Unit. Asia Pacific Journal of Multidisciplinary Research, Vol. 5, No. 2.*

(34.77%) than in public schools (31.56%). These findings are opposite previous literature, which found a higher proportion of students reporting depression symptoms in public schools than private schools because of differences in their socio-economic environments.[19]

However, the higher prevalence of depression among students in private schools than public schools may be accounted for the greater proportion of parents of students in private schools mothers of secondary students in private schools than public schools were managing or engaged in who were engaged in occupations and income-generating activities. In particular, more fathers and businesses. Business owners usually struggle to maintain a work-life balance and have reduced time for nurturing a supportive environment at home for their children-this could lead to children having absent or overworked parents. Hence, even when parents are physically present, their children may feel left behind or ignored.

Children with absentee parents are more likely to have suicidal ideation and negative emotional outcomes. In such cases, teachers and caregivers play a significant role in understanding the psychological needs of children with absentee parents and helping to address such needs to prevent risks of adolescent suicide and depression.[20] In the Philippines, the high prevalence of overseas labor migration of parents leads to children having absentee parents. Studies found that parental absence in the Philippines is associated with negative effects on the emotional and psychological well-being of left-behind children.[21]

Another possible explanation for the higher share of students with signs of depression in private than public schools could be linked to income. Since private schools usually cater to more affluent families than public schools, students face greater pressure to fit into or maintain a high socio-economic or school-based status.

While previous literature found that low levels of income are associated with mental disorders and suicide attempts[22], high income can be also a risk factor for depression. Youth from high- income households may face higher risk of depression because of the high-pressure, performance-oriented, and hyper-competitive environments they live in. Wealthy families have the resources to enroll their children into coaching, tutoring and other activities, which could result in over-parenting behaviors and over-scheduled kids. Although such activities can help improve children's capabilities, too much of them can place a great deal of pressure on children to always perform well and to become obsessed with building a social image rather than developing character, values or ethics.[23]

In terms of gender, the proportion of female students showing signs of depression (31.80%) was nearly twice the corresponding share of male students (16.07%) (Table 6). Furthermore, the share of female students with suicidal ideations was more than double than share of male students at 22.82% and 10.48%, respectively. This finding is consistent with existing literature, which found young girls to be more at risk with depression than young boys. [24]

**Table 6: Percentage of Students with Signs of Depression by Gender**

| School | Total | | Percentage of Students with Scores 5 and Above* | | Percentage of Students with Possible Suicidalities | |
|---|---|---|---|---|---|---|
| | Female | Male | Female | Male | Female | Male |
| Public School A (NCR) | 26.00 (23.13–28.87) | 16.33 (13.92–18.75) | 5.78 (4.25–7.30) | 4.89 (3.48–6.30) | 20.22 (17.60–22.85) | 11.44 (9.36–11.52) |
| Public School B (Region VI) | 30.49 (27.32–33.66) | 14.20 (11.79–16.60) | 8.27 (6.37–10.17) | 4.94 (3.45–6.43) | 22.22 (19.36–25.09) | 9.26 (7.26–11.26) |
| Private School A (Region IV-A) | 36.14 (30.88–41.39) | 14.33 (10.50–18.16) | 12.77 (9.12–16.42) | 7.48 (4.60–10.35) | 23.36 (18.74–27.99) | 6.85 (4.09–9.62) |
| Private School B (Region IV-A) | 39.32 (35.57–43.08) | 18.89 (15.89–21.90) | 12.44 (9.91–14.98) | 6.45 (4.56–8.34) | 26.88 (23.48–30.29) | 12.44 (9.91–14.98) |
| **TOTAL** | **31.80 (30.04–33.57)** | **16.07 (14.68–17.46)** | **8.99 (7.90–10.07)** | **5.59 (4.72–6.46)** | **22.82 (21.23–24.41)** | **10.48 (9.32–11.64)** |

* = Given the nine core symptoms of depression, students reporting five or more symptoms over a two-week period are deemed to be suffering from depression.
Source: Study team's calculations.

[19] *Singh, M.M., Gupta, M., and Grover, S. (2017). Prevalence & factors associated with depression among schoolgoing adolescents in Chandigarh, north India. Indian J Med Res. 146(2): 205-215.*

[20] *Fu, M., Xue, Y., Zhou, W., and Yuan, T.F. (2017). Parental absence predicts suicide ideation through emotional disorders. Retrieved https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5720745/*

[21] *Battistella, G., and Conaco, M.C. (1998). The Impact of Labour Migration on the Children Left Behind: A Study of Elementary School Children in the Philippines. Journal of Social Issues in Southeast Asia 13(2):220-241; Smeekens, C., Stroebe, M., and Abakoumkin, G. The impact of migratory separation from parents on the health of adolescents in the Philippines. Social Science & Medicine, 2012, vol. 75, issue 12, 2250-2257*

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[23] *Kang, S. (2015). How the Wealthy are Disadvantaged. Psychology Today. Retrieved https://www.psychologytoday.com/us/blog/the-dolphin-way/201512/how-the-wealthy-are-disadvantaged.*

[24] *Albert, P. (2015). Why is depression more prevalent in women?. J Psychiatry Neurosci. 40(4): 219-221.; Thapar, A., Collishaw, S., Pine, D.S., and Thapar, A. J. (2012). Depression in adolescence. Lancet. 379(9820): 1056-1067.*

The higher prevalence of depression in adolescent women is often linked with female hormonal changes. The risk of depression increases among girls after puberty as depression is associated with pubertal changes in hormone in females.[25] Hence, the sex-based difference in adolescent depression may be partly due to girls' heightened sensitivity to stress, which is hormonally- linked.[26]

However, female hormonal fluctuations alone cannot fully account for the sex difference in adolescent depression. Social and relationship patterns of girls also make them more vulnerable to depression. For example, girls are more likely to co-ruminate-or the inclination to overthink problems or harmful beliefs-with friends, which help them create more intimate relationships. However, the downside of co-rumination is that it can result in greater anxiety and risk factors for depression.[27] Females also suffer from specific illnesses related to depression that are linked with changes in ovarian hormones such as premenstrual dysphoric disorder, postpartum depression and postmenopausal depression and anxiety.[28]

While depression is generally more prevalent in girls than boys, diagnosing depression among boys is equally important. Adolescent boys are likely to express negative feelings through violence, reckless or destructive behavior, and substance abuse.[29]

Across grade levels, there is generally a higher proportion of students in grades 7 and 8 reporting depression symptoms and suicidal ideations in both public and private schools compared with other grade levels (Table 7). For example, 8.11% of students with depression symptoms in public school A were in grade 8 and 22.11% of students reporting possible suicidalities in the same school were also in grade 8.

**Table 7: Percentage of Students with Signs of Depression by Grade Level**

| School | Grade 7 | Grade 8 | Grade 9 | Grade 10 | Grade 11 | Grade 12 |
|---|---|---|---|---|---|---|
| **Percentage of Students with Scores 5 and Above*** | | | | | | |
| Public School A (NCR) | ... | 8.11 (6.33–9.89) | ... | 1.78 (0.92–2.64) | 0.78 (0.20–1.35) | ... |
| Public School B (Region VI) | 4.32 (2.92–5.72) | 2.35 (1.30–3.39) | 2.35 (1.30–3.39) | 4.20 (2.82–5.58) | ... | ... |
| Private School A (Region IV-A) | 4.05 (1.89–6.21) | 3.74 (1.66–5.81) | 2.18 (0.58–3.78) | 1.56 (0.20–2.91) | 5.61 (3.09–8.12) | 3.12 (1.21–5.02) |
| Private School B (Region IV-A) | 6.00 (4.17–7.81) | 6.45 (4.56–8.34) | 6.45 (4.56–8.34) | ... | ... | ... |
| **Percentage of Students with Possible Suicidalities** | | | | | | |
| Public School A (NCR) | ... | 22.11 (19.40–24.82) | ... | 8.77 (6.92–10.61) | 1.67 (0.83–2.50) | ... |
| Public School B (Region VI) | 8.77 (6.82–10.71) | 6.91 (5.17–8.66) | 8.15 (6.26–10.03) | 7.65 (5.82–9.49) | ... | ... |
| Private School A (Region IV-A) | 4.67 (2.36–6.98) | 6.23 (3.59–8.87) | 3.74 (1.66–5.81) | 3.43 (1.35–5.42) | 7.48 (4.60–10.35) | 4.67 (2.36–6.98) |
| Private School B (Region IV-A) | 13.52 (10.89–16.14) | 15.98 (13.35–18.60) | 9.83 (7.20–12.46) | ... | ... | ... |

* = Given the nine core symptoms of depression, students reporting five or more symptoms over a two-week period are deemed to be suffering from depression.
Source: Study team's calculations.

The prevalence of depression in the younger cohorts may be due to the onset of adolescence or puberty, which occurs between the ages of 12-16 in boys and 10-14 in girls.[30] Puberty may induce the effects of hormonal changes or transient impacts of social pressures, which are associated with risks of depression among adolescents. Moreover, puberty is a sensitive period for adolescents and their families. Around this time, adolescents start developing autonomy and hence must renegotiate with their parents to make choices based on their free will.

Early puberty is linked with depression as children entering puberty at an early age have a higher likelihood of suffering from depression.[31] Compared with boys, girls who go through puberty early are likely to face a higher risk of depression with an odds ratio of 0.83 per one year increase in age of onset of puberty.[32] Hence, whether early

[25] *Angold, A., Costello, E.J., Erkanli, A., and Worthman, C.M. (1999). Pubertal changes in hormone levels and depression in girls. Psycho! Med. 1999;29:1043-53.*

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[31] *Marceau, K. (2011). Study of Early Child Care and Youth Development. National Institute of Child Health and Human Development. Retrieved https://www.futurity.org/fast-paced-puberty-linked-to-depression/*

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puberty is a symptom of stressors or a source of stress in itself, screening for depression should commence earlier for children-especially girls-who enter puberty at an early age.

On the contrary, the prevalence of depression and suicidal ideation in private school A was highest in grade 11 relative to other grade levels. This may due to the pressure associated with transitioning into senior high school and the impending move to college or work place. Adolescents may easily feel anxious as they try balance school, friends, family and sometimes work-all of this while trying to figure out who they want be and what they want to do for the rest of their lives.

## CONCLUSION

The study reveals a high prevalence of child and adolescent depression symptoms among surveyed students in grades 7-12 at 47.87%, of whom 33.30% reported suicidal ideations. High income, absentee parents, gender, and onset of puberty are some of the risk factors for adolescent depression among the study sample. Such high prevalence underscores the importance not only of detecting children and adolescent depression, but also of conducting follow-up assessments to confirm the diagnosis of depression and provide treatment. Students with signs of depression received counseling from psychiatrists and pediatricians. Some were given prescriptions, while others were referred for psychotherapy. Moving forward, the screening tool developed in this study can be refined and administered to a wider study population to help bring greater awareness to and arrest child and adolescent depression in the Philippines.

# Atrophoderma of Pasini and Pierini on the Head and Trunk of a 32 Year-Old Male: A Case Report*

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## ABSTRACT

Atrophoderma of Pasini and Pierini (APP) is an idiopathic disorder of dermal atrophy, presenting as round or oval depressed lesions most commonly observed on the trunk and extremities. Herein, we report the first case of APP initially appearing on the head. Histopathologic examination of lesional skin demonstrated a decrease in elastic fibers. Serologic tests for Borrelia and antinuclear antibody titers were negative. There was no noted improvement after 6 weeks tretament with Hydroxycholoroquine 200 mg/tab BID. Definitive disease etiology and treatment of APP remains to be elucidated.

**Keywords:** Atrophoderma of pasini and pierini, dermal atrophy, elastic fibers

## INTRODUCTION

Atrophoderma of Pasini and Pierini (APP), is a rare disease of dermal atrophy with less than 100 cases reported in literature. It is usually seen in the second or third decade of life, with a marked female preponderance. It presents as one or several sharply demarcated depressed patches, usually on the back, chest, abdomen, and extremities. Herein, we present the first reported case of a male patient with APP lesions initially appearing on the head, followed later on by lesions appearing on the trunk.

## CASE HISTORY

A 32-year-old man presented to our clinic in 2016 for evaluation of long-standing hyperpigmented and atrophic lesions over the bitemporal areas and trunk which were present for seven years. In 2009, the patient noticed initial involvement of both temporal areas; the findings were described then as hyperpigmented macules along the hairline. The lesions grew in size and coalesced into extensive hyperpigmented patches over the next seven years. New discrete hyperpigmented macules and patches appeared on the pelvic areas of the trunk. The color of the lesions remained hyperpigmented and unchanged throughout the disease course. Six months prior to consult, lesional skin over the temporal areas and some on pelvic areas were noted by the patient to become progressively depressed in comparison to the surrounding normal skin. The lesions on the bitemporal areas particularly caused the patient cosmetic concern, which prompted consult at our institution. The patient reported no obvious accompanying symptoms other than occasional pruritus over the lesions on the temporal area. He denied sustaining trauma prior to the appearance of the lesions, any significant past medical history, use of topical or oral medications; and family history was non-contributory.

Upon physical examination, there were sharply-marginated, brown atrophic patches over the bitemporal areas (Figure 1A B) the anterior borders of which showed distinct "cliff-drop" borders (Figure 1C). Multiple, discrete hyperpigmented macules and atrophic patches were also seen over the pelvic areas (Figure ID, E), extending posteriorly to the lumbar areas (Figure IF). Lesional skin was normal on palpation, with no evidence of sclerosis nor induration. Examination of the hair, nails, and mucous membranes was normal. Review of systems was negative.

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**Figure 1A, B.** Sharply-marginated, brown atrophic patches over the right and left bitemporal areas, respectively.

**Figure 1C.** Characteristic distinct "cliff-drop" border appreciated on the right temporal lesion

**Figure 1D, E.** Multiple, discrete hyperpigmented macules and atrophic patches on the pelvic areas.

**Figure 1F.** Multiple, discrete hyperpigmented macules and atrophic patches on the lumbar area.

Histopathologic examination of skin punch biopsies taken from both the bitemporal and pelvic areas revealed no significant alteration in the epidermis (Figure 2A, B). Sections taken from the temporal area revealed a mild superficial perivascular infiltrate in the dermis composed of lymphocytes and melanophages, and thickened collagen bundles with spaces in between (Figure 2C, D). Verhoeff-Van Giesson staining was done, which showed loss of elastic fibers in the papillary and mid-dermis (Figure 2E, F).

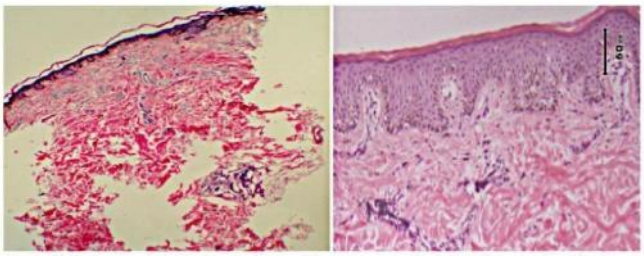

**Figure 2A, B.** Sections from the temporal and pelvic areas, respectively, showing normal epidermis, H&E, 40x.

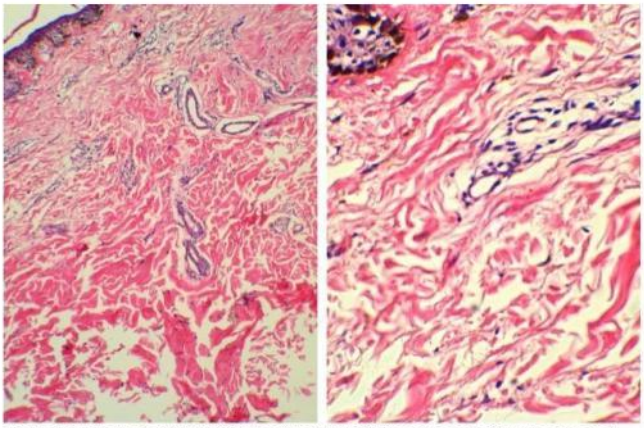

**Figure 2C, D.** Dermal mild superficial perivascular infiltrate composed of lymphocytes and melanophages, and thickened collagen bundles with spaces in between, H&E, 100x.

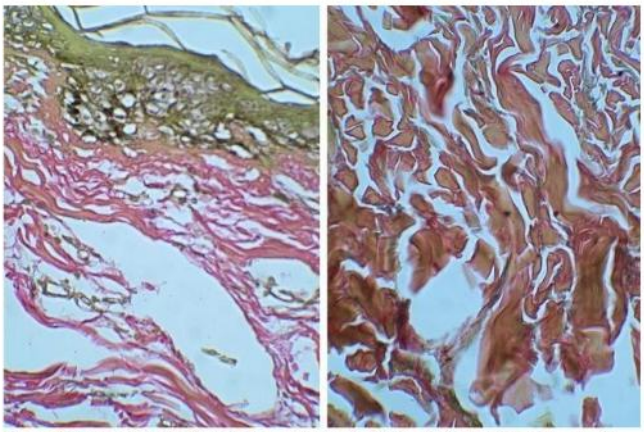

**Figure 2E, F.** Loss of elastic fibers in the papillary and mid-dermis. Verhoeff-Van Giesson, 40x.

Other laboratory testing included complete blood count, urinalysis, and tests for both liver and kidney functions, which were all within normal range. To rule out the possibility of Borrelia burgdorferi as an infectious etiology as has been

stated in previous case reports, enzyme-linked immunosorbent assay for borrelia IgG and IgM was done, which were both non-reactive. Antinuclear antibody titers were likewise negative. Clinicopathologic diagnosis was Atrophoderma of Pasini and Pierini. Treatment of APP remains anecdotal, and the negative borrelia serologies pointed towards the use of antimalarials instead of antibiotics and thus the patient was started on Hydroxychloroquine 200 mg/tab BID. Ophthalmologic clearance was obtained, and baseline laboratory determinations were done prior to starting the medication. Lesion appearance remained unchanged after 6 weeks of treatment.

## DISCUSSION

Atrophoderma of Pasini and Pierini is a cutaneous condition characetrized by varying degrees of dermal atrophy. First described by Pasini in 1923, and by Pierini and V ivoli in 1936, the disease went by many names, until the official diagnosis of Atrophoderma of Pasini and Pierini was suggested in 1958 [10]. The exact world-wide incidence of APP is unknown. Much of the scarcity of data regarding this condition can be attributed to it being underreported since it is largely asymptomatic. This disorder is more frequently encountered in women than in men, with a ratio of 6:1 [9]. It starts insidiously during the second or third decades of life [1], although a congenital case was recently reported [4].

The lesions are often distributed bilaterally and in a symmetrical fashion [1], although a zosteriform distribution has also been observed [S]. Lesions have been reported most commonly to occur on the trunk, especially on the back and lumbosacral region, followed in frequency by the chest, arms, and abdomen. Characteristic lesions initially appear as single or multiple round or oval patches, 2 to 3 cm in diameter, which persist and may progress into atrophic patches over many years. The affected skin is described as having an inverted plaque appearance, which Stoner and Dixon described as resembling "footprints in the snow" *6+. Atrophic patches may grow and coalesce to encompass large areas of the trunk and proximal extremities, resulting in sharply demarcated edges referred to as "cliff drop" borders. The disease tends to be progressive over a course of 10-20 years. Eventually, no further progression occurs, yet existing lesions characteristically do not involute. Diagnosis is based on clinical findings, with histology playing a role in excluding other diagnoses.

The histopathologic changes in APP are often minimal and non-diagnostic, consist of a decrease in the size of the dermal papillae, with flattening of the rete ridges. The epidermis is usually normal or slightly atrophic. Melanin is increased in the basal layer, and interstitial edema and a mild perivascular infiltrate, consisting of lymphocytes and histiocytes, may be present. The collagen bundles show varying degrees of homogenization and clumping in the mid- and reticular dermis with subsequent reduced dermal thickness.

The etiology and exact nosology of APP have always been a matter of debate. Some authors have linked it to infection with Borrelia burgdorferi, such as Buechner and Rufli [11] who studied the sera of 26 patients with typical APP lesions. Ten of the 26 patients had significantly elevated titers of IgG anti-Borrelia burgdorferi antibodies. However, none of the patients had an elevated IgM titer. The role of B. burgdorferi in APP is unclear, but some physicians have utilized positive test results for B. burgdorferi as support for treating APP with antibiotics. Some authors believe it as well to be a variant of localized scleroderma or morphea. Buechner and Rufli describe APP as an "abortive primarily atrophic variant of morphea" *11+ and Amano et al believe that morphea and APP are a "similar nosologic entity" *12+. Although similarly atrophic in nature the conditions can be distinguished by their contrasting age of predilection, duration of disease course, and by the striking lack of inflammation in lesions of APP. Lesions of morphea are ivory with a lilac border and tend to appear more inflamed, exhibiting induration, edema, and erythema [6]. In contrast, atrophic lesions of APP are violaceous or brown, with sharply demarcated borders that coalesce over time, producing a moth-eaten appearance that is not consistent with morphea. Whether atrophoderma is a nonsclerotic, primarily atrophic variant of morphea or a separate distinct entity is still debated [3].

No definitive treatment for APP exists. Topical and systemic steroids, antimalarials, D-penicillamine, antibiotics, and phototherapy have been used with variable efficacy. Q- switched alexandrite laser (755 nm) was found to be effective in diminishing the hyperpigmentation of APP lesions after three treatments in one case [7]. Two case reports exist in which oral therapy was instituted for APP: one employed 200 mg/day of Doxycycline for a patient that had positive Borrelia antibodies, in which improvement was seen after six weeks [14], while in 2006, Carter et al [8] described a 38-year-old female patient who responded dramatically to a 400-mg daily dose of hydroxychloroquine. The patient had positive antinuclear antibody serology for which underlying lupus was suspected. She also had low levels of rheumatoid factor, and no lyme disease antibodies detectable on serology and experienced "notable improvement" in all lesions after 5 months and complete clearing of facial and trunk lesions after 1 year. Our patient received Hydroxychloroquine 200 mg/tab BID for 6 weeks which did not improve the patient's lesions. We believe that Hydroxychloroquine may still prove to be a viable treatment option in patients with APP, more so in those with positive atinuclear antibodies, and given over a more prolonged treatment period.

## CONCLUSION

This is the first reported case of APP to occur initially on the head of a male patient, with subsequent involvement of the trunk. Though the disease remains stable and with a favorable prognosis, it can have cosmetic implications. There remains a need to determine a definitive, albeit effective treatment for APP.

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# Bullous Henoch-Schdnlein Purpura in 9-year old Filipino Male: A Case Report*

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## ABSTRACT

Henoch- Schonlein purpura (IgA vasculitis) is the most common vasculitis in the pediatric population. It usually affects the skin, synovia, gastrointestinal tract, and kidneys. It usually presents as a palpable purpura. The occurrence of hemorrhagic bullae in children with HSP is an uncommon presentation. We present a case of an otherwise healthy 9-year-old male with a three-day history of erythematous maculopapular lesions over the lower extremities which progressed to violaceous plaques with central hemorrhagic bullae affecting the bilateral lower extremities, buttocks and arms. Odynophagia and intermittent abdominal pain were present. Histopathology revealed small vessel leukocytoclastic vasculitis and direct immunofluorescence (DIF) showed granular deposition of IgA and fibrinogen along the walls of the papillary dermal blood vessels. The patient was successfully treated with prednisone at 1mg/kg/day and showed resolution of lesions within 1 week of treatment with no recurrence at 1 month follow-up. We stress the importance of having a high index of suspicion in these atypical presentations in order to prevent delay in diagnosis and achieve maximal treatment gains.

**Keywords:** bullous henoch- schonlein purpura, pediatric, IgA vasculitis, rare, case report

## INTRODUCTION

Henoch- Schonlein purpura (IgA vasculitis) is the most common vasculitis in the pediatric population. It accounts to 75% of cutaneous necrotizing vasculitis in children, and 25% in adults. It usually affects the skin, synovia, gastrointestinal tract, and kidneys. It usually presents as a palpable purpura (1). The occurrence of hemorrhagic bullae in children with HSP is an uncommon presentation which occurs in 2% of HSP cases (2). We present a case of a 9-year old Filipino male with bullous HSP successfully treated with oral corticosteroids.

## CASE REPORT

An otherwise healthy 9-year-old male presented with a three-day history of erythematous maculopapular lesions over the lower extremities, which progressed to violaceous plaques with central hemorrhagic bullae. The lesions noted to gradually progress affecting the bilateral lower extremities, buttocks, and few on the arms. The lesions were noted to be pruritic and tender to touch. The patient denies manipulation of the lesions. It was accompanied by odynophagia and intermittent abdominal pain. No joint pains or urinary symptoms were noted. There was no family or personal history of skin disease. He consulted a pediatrician and was started on an unrecalled dose of Clindamycin which was subsequently shifted to Co-Amoxiclav which provided no relief.

Cutaneous examination revealed multiple erythematous macules, papules and plaques with hemorrhagic bullae over the bilateral lower legs, buttocks and few on the arms (Figure 1,2). Diascopy was positive.

Laboratory values on admission revealed leukocytosis (18.86 x 10^9/L [reference range: 4.00-10.00 x 10^9/L]) with neutrophilic predominance (0.82 [reference range: 0.350-0.850]), thrombocytopenia (502 x 10^9/L [ reference range:

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150-450 x 10^9/L]), elevated erythrocyte sedimentation rate (40 mm/hr [reference range: 0-20 mm/hr]), normal blood urea nitrogen (4.00mmol/L [reference range: 2.5-6.4mmol/L]), low creatinine (45.50 umol/L [reference range: 62-115]), low sodium (133.0 mmol/L [135.0-148.0 mmol/L), normal potassium (4.01mmol/L [reference range: 3.5-53mmol/L]), low chloride (96.7 mmol/L [98.0-107 mmol/L]), and normal ionized calcium (1.24 mmol/L [1.13-1.32 mmol/L]). Urinalysis showed ketonuria (+1). No hematuria or proteinuria were noted. Fecal occult blood was weakly positive. Culture and sensitivity of the aspirate was done with negative results.

A skin biopsy was performed and histological examination revealed a small vessel leukocytoclastic vasculitis (Figure 5), and direct immunofluorescence analysis revealed granular deposition of IgA and fibrinogen along the walls of the papillary dermal blood vessels (Figure 6), consistent with Henoch- Schonlein Purpura.

The patient was started on Prednisone 20mg/5ml 7ml OD (1 mkD), Diphenhydramine 30mg/IV every 6 hours (1 mkd), and Omeprazole 30mg IV OD. The abdominal pain improved and the bullous lesions resolved within 1 week leaving only post inflammatory hyperpigmentation (Figure 3,4). No recurrence and adverse events were noted at 1 month follow up.

## DISCUSSION

Henoch Schonlein Purpura (IgA vasculitis) is the most common vasculitis in children. It has an incidence of 20.4 per 100,000 per year. It is highest in children age 4 to 6 years old, and more common in males than female having a 1.2-1.0 ratio (3).

The diagnosis of HSP is based on the European League Against Rheumatism (EULAR) and the Paediatric Rheumatology European Society (PReS) consensus criteria for classification of childhood vasculitides. The criteria for diagnosing HSP would include a palpable purpura in the presence of at least one of the following features: diffuse abdominal pain, biopsy showing predominant IgA deposition, arthritis or arthralgia, and renal involvement (proteinuria or hematuria) (4).

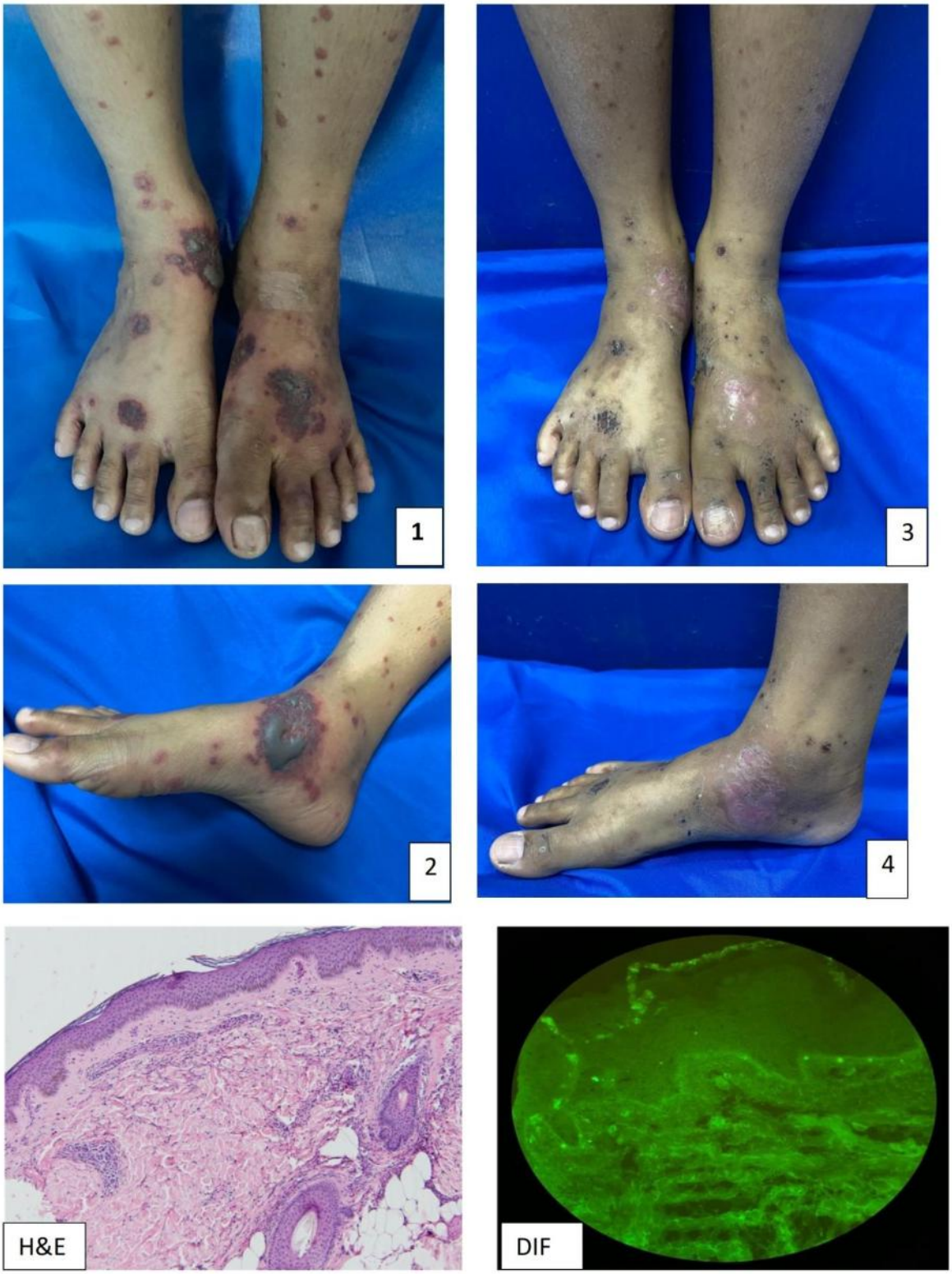
The occurrence of hemorrhagic bullae in children with HSP is an uncommon presentation which occurs in 2% of HSP cases (2). The pathogenesis of bullous lesions in HSP is unknown. One study in Japan reported elevated metalloproteinase-9 (MMP-9) in the blister fluid using zymography. MMP-9 which is secreted by polymorphonuclear leukocytes on the dermal side of the dermo- epidermal junction migrated from the lesions of intensive vasculitis. This could cause blister formation by degrading the basement membrane components such as type VII collagen (5). Early biopsy of the lesion is essential to make a diagnosis of bullous HSP. Ideally, biopsy must be done within 48 hours because immunoreactants such as IgA and C3 tend to destroyed during that timeframe (6). Histopathologic finding of leukocytoclastic vasculitis was reported on all cases, however IgA deposition are not positive in all cases (7). In a review of cases by Su et al, only 31.6% was positive for IgA which might be explained by the timing of the biopsy (8).

To date, there is still no guidelines regarding the management of hemorrhagic lesions in HSP. Several drugs has been used such as corticosteroids, anti-inflammatories, and immunosuppressants (9). Of which, the most commonly used drug in the management of bullous HSP are oral corticosteroids. Several reports have shown that early prednisone therapy reduces severity, extent, and sequelae of bullous lesions (10,11).

## CONCLUSION

In summary, we report a case of a 9-year old male who presented with an uncommon presentation of Bullous Henoch Schonlein Purpura. The patent was diagnosed early thru histopathology and direct immunofluorescence. and was then successfully treated with oral corticosteroids which led to the resolution of all lesions with post inflammatory hyperpigmentation and no recurrence.

In cases like this we stress the importance of having a high index of suspicion in these atypical presentations in order to prevent delay in diagnosis. Referral to a dermatologist is also recommended. We also stress the importance of early biopsy and initiation of treatment to achieve maximal treatment gains.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# Idiopathic Follicular Mucinosis in a 32-year old Filipino Man Successfully Treated with Narrow-band UVB: A Case Report*

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## ABSTRACT

**Introduction:** Follicular mucinosis is a rare skin condition, which can present as an idiopathic benign condition or as a secondary symptom of a malignant disorder, most commonly mycosis fungoides. Since its first description in 1957, only 90 cases have been reported worldwide. This condition is characterized by erythematous infiltrated plaques with scaling, sometimes with follicular prominence on the head and neck. Definitive diagnosis is made histologically.

**Case:** A 32-year old male presented with a 3-year history of recurrent scaling with eruption of pruritic erythematous papules and plaques over the face, neck and chest. Different local treatments (topical corticosteroids, antifungal cream and moisturizers) were ineffective. Overall, he was healthy. Histopathological examination of the lesion showed typical histological picture of follicular mucinosis. Alcian blue stain was positive. The patient was successfully treated with narrow-band UVB (NB-UVB) therapy with no recurrence of lesions after one- month follow-up.

**Conclusion:** Idiopathic follicular mucinosis is a benign condition with localized involvement and excellent prognosis. However, long-term follow-up and monitoring is recommended because of its association with malignancy.

Follicular mucinosis is a rare dermatosis, characterized histologically by the presence of mucin deposits within the hair follicle and sebaceous glands.[1] There are three clinical types determined. The first and the most common type occurs as an idiopathic benign disorder, typically seen in young patients. The second type affects people 40-70 years of age and has a more chronic course.

The third type usually occurs in the elderly and presents with widespread lesions. It can arise as a secondary symptom of a malignant disorder, most commonly mycosis fungoides.[2]

## CASE REPORT

A 32-year-old Filipino male presented with a 3-year history of recurrent scaling over the glabella, nasolabial folds, preauricular areas, pinnae of the ears and maxillary area, which would resolve spontaneously or whenever the patient applies a facial moisturizer. One week prior to consult, there was persistence of the scaling with the eruption of pruritic erythematous and some skin-colored papules and plaques over the face, neck and chest. The patient applied virgin coconut oil three times a day which provided a slight decrease in scaling. Some papules eventually coalesced to form plaques while some formed erythematous nodules over the face. The patient discontinued application of virgin coconut oil and self-medicated with cetirizine 10mg once daily which gave temporary relief of the pruritus.

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Review of systems was unremarkable.

Past medical, family and personal histories were noncontributory.

Upon consult, the patient had stable vital signs. Examination of the skin revealed multiple erythematous follicular scaly papules, nodules and plaques over the forehead, cheeks, nasolabial folds, chin, ears, posterior auricular area, neck, and chest (Figure 1 A-D), with no loss of hair and no palpable lymph nodes. The rest of the physical examination was normal.

The initial impression at that time was seborrheic dermatitis. The patient was prescribed hydrocortisone + miconazole (Daktakort) cream, applied twice daily over the affected areas and cetirizine 10 mg daily, which resulted to an increase in erythema, scaling, number and size of papules and plaques over the affected areas. Follow-up consult was done in which the patient was reassessed with allergic contact dermatitis secondary to hydrocortisone + miconazole (Daktakort) cream. The patient was then given prednisone 10 mg daily for 5 days. Cetirizine was continued while hydrocortisone + miconazole (Daktakort) cream was shifted to mometasone furoate cream. The patient noted a decrease in the number and size of the lesions with resolution of some lesions. However, recurrence of lesions was noted 5 days after discontinuation of medications. Intralesional triamcinolone injection 10mg/ml was injected once over the nodules, which provided slight improvement. However, the scaly papules and plaques over the face and chest persisted. A 3-mm skin punch biopsy was obtained from an indurated plaque over the left temporal area. Histopathology showed irregular acanthosis, moderate to dense superficial and deep perivascular and periadnexal mixed cell infiltrates consisting of lymphocytes, histiocytes and numerous eosinophils admixed with extravasated red blood cells (Figure 2A). Mucin is deposited within the follicles and throughout the dermis, confirmed by alcian blue stain (Figure 2B).

With these findings, an impression of follicular mucinosis was given.

The patient was treated with ten sessions of narrow-band ultraviolet B (NB-UVB) therapy twice a week, starting at 200 mj, with the dose increased by 20% with each succeeding session. The therapeutic dose was increased by only 10% on the 9$^{th}$ session and was maintained on the 10$^{th}$ session. Desonide cream was also applied over affected areas twice daily for a week. Total resolution of lesions was noted after 10 sessions of UV8 and no recurrence was noted after one month of follow-up.

## DISCUSSION

In 1957, Pinkus[3] first coined the term alopecia mucinosa to 6 cases of follicular papules or indurated plaques with alopecia. This was characterized histologically by mucinous change in the pilosebaceous follicle.[4] Since alopecia is not conspicuous outside the scalp or eyebrows, this disorder is also known as follicular mucinosis. The accumulation of mucin creates an inflammatory condition and subsequent degenerative process. When this condition affects hair-bearing areas, a non-scarring alopecia, also known as alopecia mucinosa can result.[2]

The exact pathogenesis is unknown, although the role of cell-mediated immunity and circulating immune complexes have been considered.[2] It is considered a reaction of the follicular epithelium to diverse stimuli[5] and can occur in several inflammatory, infectious and neoplastic skin conditions.[6] Follicular mucinosis affects all races and ages with equal sex predilection.

Follicular mucinosis typically presents as erythematous infiltrated plaques with scaling and sometimes follicular prominence on the head and neck.[2] These plaques are covered by open porous pilosebaceous, small follicular papules and alopecic areas. However, atypical presentation includes nodular forms that may mimic folliculitis, chronic eczema, seborrheic dermatitis[4], acneiform lesions?, and urticaria. In this case, the patient was initially managed as a case of seborrheic dermatitis, however, no clinical response was observed after the patient was given a combination of corticosteroid and antifungal medication. The loss of hair in plaques with follicular papules but minimal inflammatory changes should suggest the diagnosis but a definitive diagnosis of follicular mucinosis is made histologically. Therefore, multiple biopsies and serial sectioning of tissue are necessary to confirm the diagnosis.[4]

Histologically, follicular mucinosis is characterized by mucinous degeneration in the external sheath of the hair follicle and of the sebaceous gland. This could be followed by formation of cystic spaces, which are partially covered by mucin. Inflammatory infiltrates in the primary form of follicular mucinosis are perivascular and perifollicular, comprised of lymphocytes and eosinophils.[5] Differentiation between primary and lymphoma-associated follicular mucinosis based on histological basis can be very difficult. Nevertheless, generally, the presence of a high number of eosinophils in the inflammatory infiltrate and marked mucinous alterations in the follicular epithelium favor a benign form, while the presence of epidermotropism and dense perifollicular infiltrate of atypical cells point to the lymphoma-associated form of follicular mucinosis.[4]

The patient's biopsy showed moderate to dense mixed cell infiltrates in the superficial and deep perivascular and periadnexal areas. The infiltrates mainly consisted of lymphocytes, histiocytes and numerous eosinophils, with no findings of epidermotropism of the hair follicular epithelium or dense infiltrate with atypical cells. Mucin deposition was also noted within the follicles and throughout the dermis. With the above findings, classification under the benign type of follicular mucinosis can be supported. Other factors that could point to the benign nature of the condition include the young age of onset, confinement of lesions to the face and neck and short recovery period.

There is no standard therapeutic approach for follicular mucinosis. Therapeutic options include topical and systemic psoralen and ultraviolet A (PUVA), NB-UVB, topical and intralesional steroids,[8] minocycline and in more severe cases, topical nitrogen mustard, dapsone, indomethacin,[9] retinoids, electron beam therapy, radiation, chemotherapy and interferon alpha.[9] The patient noted complete resolution of lesions after undergoing ten sessions of NB-UVB therapy (Figure 3 A-C) with no report of reappearance of new lesions.

In a report by Taniguchi[10], a 56-year old Japanese female, who presented with indurated erythematous plaques on the trunk and lower extremities was diagnosed with folliculotropic mycosis fungoides, and was successfully treated with NB-UVB. The minimal erythema dose (MED) was determined to be at 1.2 J/cm$^2$. The surface of the body affected was irradiated with 70% MED (0.8J/cm2) on the first session, increased by 10% on the second session. Papules and nodules on the trunk and lower extremities decreased after 8 exposures, after which she continued irradiation at the same dose once a week. After 24 exposures, all of the lesions had completely disappeared. On follow-up after 3 years, no new skin lesions were observed. Ultraviolet B (UVB) has been shown to decrease the antigen presenting capacity of Langerhans cells, increase interleukin-2 and interleukin-6 production by human keratinocytes, as well as increase the level of TNF alpha. UVB is thought to be therapeutic by suppressing the function of the neoplastic population of clonal T cells in the skin by serving as an upregulator of the immune system.[10]

## CONCLUSION

Follicular mucinosis is a rare dermatosis that typically presents as erythematous infiltrated plaques with scaling and sometimes, follicular prominence on the head and neck. Based on the age of onset of the condition, confinement of the lesions to localized areas, fast recovery period after treatment and with the histopathologic findings, the patient most likely has the idiopathic type of follicular mucinosis. Although his clinical presentation is atypical in that it mimicked seborrheic dermatitis, the patient was managed accordingly through histopathologic findings. However, even if with excellent prognosis, the patient must be monitored and followed-up long-term because of the condition's association with malignancy.

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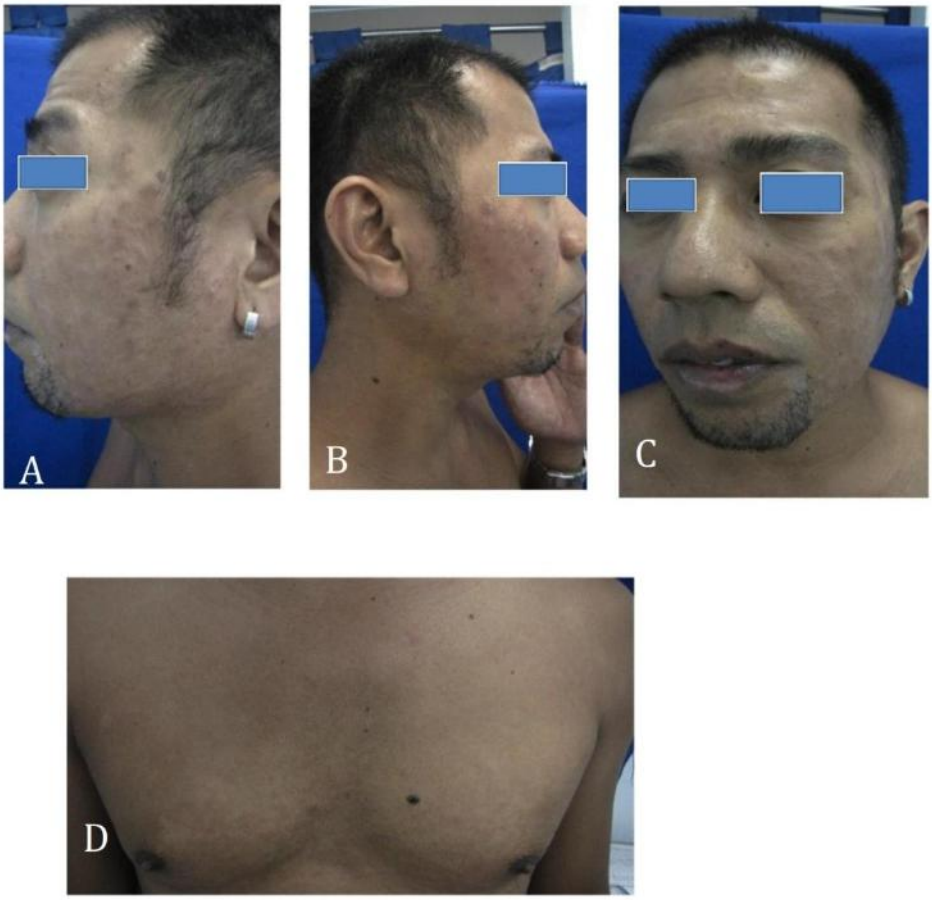


Figure 1 A-D. Multiple erythematous scaly follicular papules, plaques and nodules on the forehead, cheeks and pre-auricular area (without loss of hair), chest before treatment

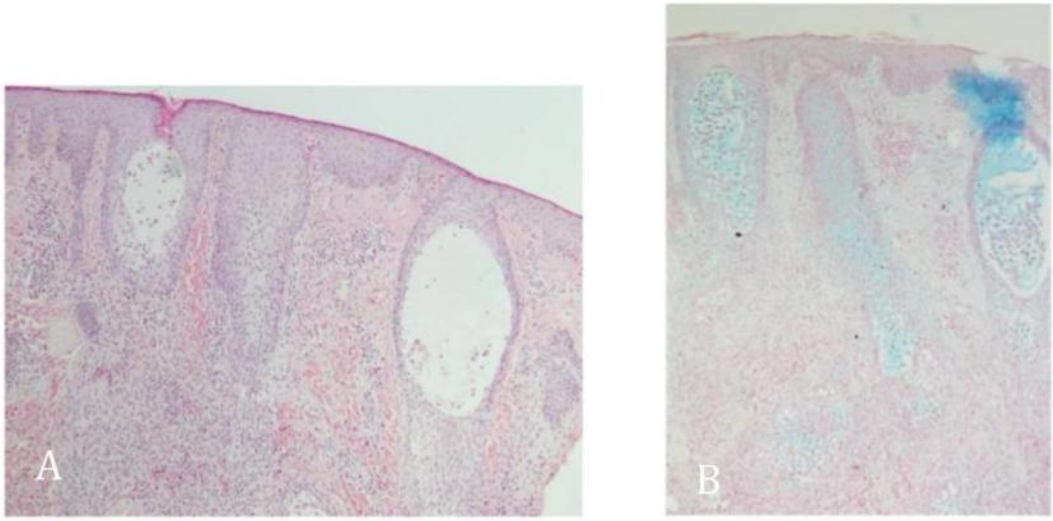


Figure 2. (A) Follicles surrounded by mixed cell infiltrates; (B) Mucin is deposited within the follicles and throughout the dermis confirmed by alcian blue stain (10x magnification)

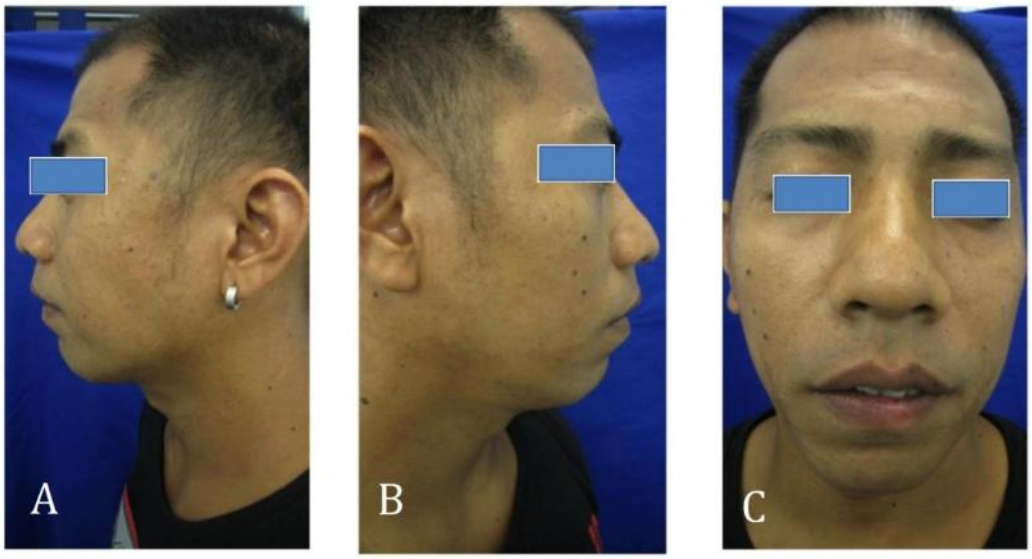


Figure 3 A-C. Resolution of skin lesions after ten sessions of NB-UVB

# IgA Pemphigus, Intraepidermal Neutrophillic Type in an 8-year Old Filipino Female*

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**Vanessa Anne C. Bernal, MD, DPDS[1]**
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## ABSTRACT

**Introduction:** IgA pemphigus is a rare, chronic, relapsing, benign group of autoimmune intraepidermal blistering dermatosis with an unknown etiology. It is characterized by significantly pruritic, vesiculopustular lesions that occur mainly on the trunk and proximal extremities. Histopathologic and immunofluorescence studies show intraepidermal blisters and deposition of immunoglobulin A in the intercellular spaces of the epidermis, respectively.

**Case Report:** To our knowledge, we present the first reported pediatric case of IgA pemphigus, intraepidermal neutrophilic type, in an 8-year old Filipino female with a 2-year history of generalized papules and flaccid pustules, some forming an annular pattern. Diagnosis was confirmed by histopathology and direct immunofluorescence. Enzyme-linked immunosorbent assay for Desmoglein 1 was negative. Complete clearance of lesions was achieved with dapsone, colchicine and prednisone.

*Keywords: IgA Pemphigus, Intraepidermal neutrophilic dermatosis*

## INTRODUCTION

IgA pemphigus is a rare bullous dermatosis with only 70 cases reported worldwide.[1] It is characterized by pruritic, vesiculopustular eruption caused by epidermal deposition of IgA autoantibodies.[3] IgA pemphigus is currently divided into two subtypes: intraepidermal neutrophilic dermatosis-type (IEN-type) and subcorneal pustular dermatosis-type (SPD-type).[2] To our knowledge, this is the first reported case of IgA pemphigus, intraepidermal neutrophilic type in the Philippines.

## CASE REPORT

An 8-year-old female presented with a 2-year history of pruritic vesicles and pustules, some coalescing to form annular patterns. Lesions initially appeared on both lower extremities, eventually becoming generalized. Patient was seen and unsuccessfully treated by several physicians until she was referred to Pediatrics as a case of Systemic Lupus Erythematosus. However, clinical and laboratory evaluations were unable to support said diagnosis. The patient was subsequently referred to Dermatology department for evaluation.

Physical examination revealed generalized involvement, with sparing of the palms and soles. Lesions consist of multiple, well-defined, erythematous to hyperpigmented papules, pustules and annular plaques that coalesced becoming polycyclic, with central clearing and erythematous,

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scaly, indurated borders (FIGURE 1). Oral and genital mucosa were uninvolved. Potassium hydroxide mount revealed long septated hyphae. Initial skin biopsy demonstrated psoriasiform dermatitis with intraepidermal pustules (FIGURE 2). Initial impression was generalized tinea corporis. Patient was started on oral and topical antifungals and antibiotics, with partial improvement.

Figure 1. Multiple, well-defined, erythematous to hyperpigmented papules, pustules and annular plaques that coalesced becoming polycyclic, with central clearing and erythematous, scaly, indurated borders.

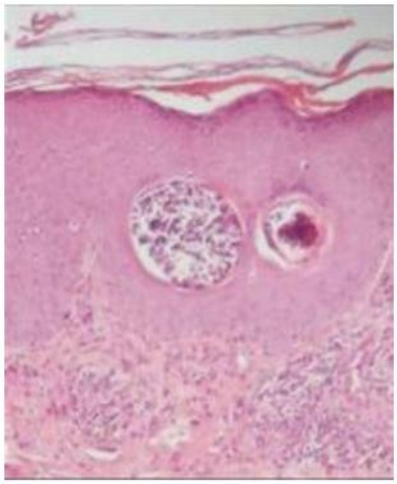

Figure 2. Intraepidermal vesiculopustular d ermatitis with predominantly neutrophilic infiltrates.

On subsequent visits, multiple flaccid pustules, some coalescing to form annular patterns, were noted (FIGURE 3). Healed lesions presented with hyperpigmented patches. At this time, an autoimmune blistering disease at was considered. Previous medications were discontinued and patient was started on oral prednisone at 1.5mg/kg/day. Repeat skin biopsy showed intraepidermal vesiculopustular dermatitis with predominant neutrophilic infiltrates (FIGURE 4). DIF revealed abnormal granular intercellular deposits of IgA (+2) in the epidermis (FIGURE 5). No abnormal deposits of IgG, IgM, C3 and Fibrinogen were seen in the epidermis, basement membrane zone or dermal vasculature. Enzyme-linked immunosorbent assay for Desmoglein 1 was negative. Final diagnosis was IgA pemphigus, intraepidermal neutrophilic (IEN) type.

Figure 3. Multiple flaccid pustules, some coalescing to form annular patterns

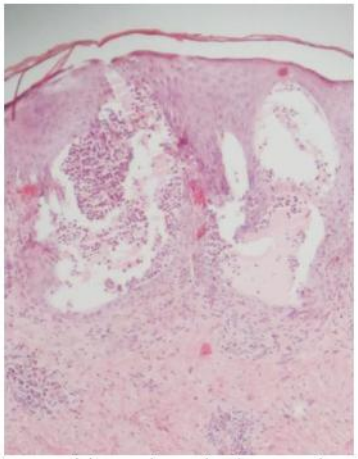

Figure 4. Intraepidermal vesiculopustular dermatitis with predominantly neutrophilic infiltrates.

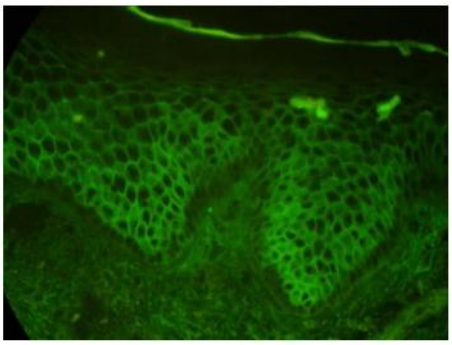

Figure 5. Abnormal granular intercellular deposits of IgA (+2) in the epidermis.

After determining that glucose-6-phosphate dehydrogenase level was normal, oral Dapsone at 1.25mg/kg/day was added after tapering the dose of prednisone to 0.5mg/kg/day, resulting in clearance of lesions within 3 weeks with few new blisters. Colchicine at 0.5mg/day was also added, which resulted in complete resolution of symptoms after 10 weeks of treatment (Figure 6a&b).

Figure 6A&B. Complete resolution of symptoms presenting as multiple, well defined, hyperpigmented patches.

## DISCUSSION

IgA pemphigus is a rare, chronic, recurrent, benign autoimmune blistering dermatosis, commonly occurring in the middle age group, rarely in children.[2,4,6] The initiating mechanism is unknown.[8] Patients present with significantly pruritic flaccid pustules or vesicles that coalesce into annular, circinate or bizarre serpinginous configuration on an erythematous or normal skin.[8,9,10] The eruption tends to occur symmetrically with no atrophy or scarring, but occasionally leaves hyperpigmentation.[4] Sites of predilection are the trunk and proximal extremities, however, the scalp, postauricular, and intertriginous areas may be affected. Mucosal involvement is rare.[2,8]

IgA pemphigus is subdivided into: subcorneal pustular dermatosis (SPD) type, which targets desmocollin 1 (Dsc1), and the intraepidermal neutrophilic (IEN) type, the target antigen of which is still unknown (probably a nondesmosomal cell surface protein).[2] Although, it was reported that desmoglein 1 was a target antigen in an adult case of IEN type, this tested negative in our patient. [5,6] Subcorneal pustules with intercellular IgA deposits restricted to the upper epidermis characterize the SPD variant while the IEN variant shows deep epidermal pustules and intercellular IgA deposits in the lower or entire epidermis, as seen in our case.[7] Both demonstrate sparse, superficial acantholysis and a significant neutrophilic infiltrate.[2]

IgA pemphigus can rarely be associated with other medical disorders, including IgA monoclonal gammopathy, pyoderma gangrenosum, rheumatoid arthritis, Sjogren syndrome, Crohn's disease, gluten-sensitive enteropathy and HIV infection.[9,11,12]

In terms of treatment, dapsone is the drug of choice, in contrast to other forms pemphigus (i.e. IgG pemphigus) that respond mainly to steroids. The initial dosage of dapsone is 50-150 mg daily, with complete remission most often obtained.[1,8] In cases of dapsone intolerance, sulfapyridines and retinoids (acitretin) are alternatives.[8,11,13] Systemic corticosteroids are less effective, although it can suppress generalized flares when given at high doses.8,16 Responses using colchicine, azithromycin, cyclosporine, PUVA, and infliximab have also been reported in some cases.[8, 14, 15]

## CONCLUSION

To our knowledge, this is the first reported pediatric case of histopathology and DIF-confirmed IgA pemphigus in the Philippines, with excellent response to dapsone and colchicine. This entity should be considered in patients presenting with pruritic vesicles to flaccid pustules forming circinate crusted plaques, with sites of predilection on the trunk, intertriginous areas and scalp.

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