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# Contents

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- 1** “NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon” an inter-professional community nutrition program – a health outcome evaluation  
Jose Ronilo G. Juangco, MD, MPH; Ramon Jason M. Javier, MD, MSTM; Januario E. Sia-Cunco, MD, MHSE; Clarita C. Penalba, RN, MAN, PhD; John Lemuel A. Balatucan, PTRP; Ingrid M. Paneda, MD and Guillano C. Lacsamana, RMT, MOH
- 10** Knowledge, attitude and practices (KAP) of nursing staff regarding depressive disorders in a private hospital in Quezon City, Philippines  
Hecil A. Cruz, MD and Melissa Paulita V. Mariano, MD
- 20** The comparison between management recommendations of the Neonatal Early Onset Sepsis Calculator and CDC/AAP Guidelines among culture-proven early onset sepsis admitted at University of East Ramon Magsaysay Memorial Medical Center from January 2013 to December 2017  
Angelia Septiane Beandda, MD; Katherine Mae A. Doctor, MD and Jacqueline Doctor Bernabe, MD, MMHoA
- 29** Quality of life among Filipino amputees after prosthetic rehabilitation at the UERMMMCI Philippine School of Prosthetics and Orthotics Charity Clinic  
Hannah Lois G. Tarroja, MD and Cherryrich M. Cheng, MD
- 37** A cross-sectional study on the HIV-related knowledge, attitudes and practices of male youth having sex with men in Metro Manila  
Beatriz Z. Arellano; Aliza Mariel B. Armamento, RMT; Donita N. Arnesto; John Paul S. Arquines, RMT; Joanna Mae S. Avanceña, RMT; Erica Charleen M. Baluan; Axl Rose B. Bangit, RMT; Reshan D. Baoas, MS; Fatima Mae B. Barateta, RCh; Angela Carmina Q. Barroquillo, PTRP; Calvin EJ R. Bautista, RPh; Shaila P. Bautista and Jose Ronilo G. Juangco, MD, MPH
- 45** Association between duration of gadget use and the socio-emotional difficulties of junior high school students in selected private schools in Quezon City: An analytic cross-sectional study  
Bianca Mari B. Dizon, Marie Krista Yna D. Dolor, Angelica Jane T. Domalanta, Princess Fe M. Domingo, Jeune Azelia V. Dominguez, Abegail M. Dulay, Vlanche April C. Dulfo, Hazel Monique A. Dumo, Kristel Joyce T. Ebuengan, Danielle Dominique L. Eduardo, Patricia Denise J. Ela, Toni Anne B. Elarmo, Maria Peñafrancia L. Adversario, MD
- 52** Experiences and perceptions of former medical students on the neurology curriculum: A reminiscing focus group discussion  
Amado M. San Luis, MD, MSPH; Cely D. Magpantay, PhD and Jose D. Quebral, MD
- 63** Mental health promotion program to enhance maternal adjustment among postpartum women  
Ria Valerie D. Cabanes, MAN, RN
- 72** Efficacy and safety of monopolar radiofrequency for the improvement of facial skin laxity and rhytides: A systematic review of clinical trials  
Maria Niña F. Pascasio, MD; Sharon Margaret V. Wong, MD; Camille Berenguer-Angeles, MD; Cindy Jao-Tan, MD; Lian C. Jamisola, MD and Alma T. Amado, MD
- 79** Carcinosarcoma expleomorphic adenoma of the parotid gland with no history of long-standing or recurrent pleomorphic adenoma – a case report  
Francia Victoria A. De Los Reyes, MD, Socorro Cruz-Yañez, MD and Maria Josefa DL. Mesina, MD

## **In Memoriam**



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# “NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon” an inter-professional community nutrition program – a health outcome evaluation\*

Jose Ronilo G. Juangco, MD, MPH<sup>1</sup>; Ramon Jason M. Javier, MD, MSTM<sup>1</sup>; Januario E. Sia-Cunco, MD, MHSE<sup>1</sup>; Clarita C. Penalba, RN, MAN, PhD<sup>2</sup>; John Lemuel A. Balatucan, PTRP<sup>3</sup>; Ingrid M. Paneda, MD<sup>1</sup> and Guillano C. Lacsamana, RMT, MOH<sup>4</sup>

## Abstract

**Introduction** This study measured the impact and outcome of an inter-professional community nutrition program labeled as “*NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon.*” The program was a multi-disciplinary approach towards the attainment of proper nutrition for identified malnourished preschool age children in Barangay San Isidro, Rodriguez, Rizal.

**Methods** This was a mixed quantitative-qualitative program evaluation. The quantitative part consisted of a longitudinal observational study design, which reviewed the data of the children who received the nutritional intervention. The qualitative study was done with a phenomenological approach, using a thematic analysis for the process and impact evaluation by means of a focus group discussion and key informant interview processes.

**Results** There was a statistically significant increase in weight (2.32 kg) and height (3.04 cm) in terms of Z-scores. A total of 29 out of 30 malnourished children graduated with 1 to 3 degrees of improvement in their Z-scores. The program impact showed 1) overall improvement of the state of health of the children; 2) inculcation of family values, which emphasized the giving of more quality time of parents to their children, and teaching them to socialize and be courteous; and 3) better orientation of the children towards more nutritious food choices. The process evaluation focused on the positive disposition of the inter-professional collaboration and brought out transference of this attitude to the children and parents.

**Conclusion** “*NUTRI-CHIKA: Usapan Tungkol at Para sa Nutrisyon*” achieved its program objectives and impacted on the family and community, improving the overall state of health of the children and providing positive disposition and family values to the participants.

**Keywords:** program evaluation, nutrition, inter-professional health education

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### Correspondence:

Jose Ronilo G. Juangco, MD, MPH, Department of Preventive and Community Medicine, College of Medicine, University of the East Ramon Magsaysay Memorial Medical Center Inc., 64 Aurora Boulevard, Barangay Doña Imelda, Quezon City, PH 1113;  
e-mail: ronniejuangco@gmail.com

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<sup>1</sup> College of Medicine, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

<sup>2</sup> College of Nursing, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

<sup>3</sup> College of Allied Rehabilitation Sciences, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

<sup>4</sup> College of Allied Health Professions, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

The global burden of malnutrition remains as a debilitating problem in the health status of children worldwide so that the goal to end hunger, achieve food security and improve nutrition is highlighted in the Sustainable Development Goals (SDG) of the United Nations as an aftermath of the failure to achieve the Millennium Development Goals across nations. The 8th and latest National Nutrition Survey conducted by the Food and Nutrition Research Institute (FNRI) shows that for children 5 to 10 years old, 29.1% are underweight, 29.9% are stunted, 8.6 % are wasted, and 9.1% are overweight.<sup>1</sup> Though there is a slight reduction in underweight among the 0-10 years old, the prevalence also remains to be medium to high and a public health concern.<sup>1</sup>

In line with the corporate and social responsibility (CSR) of the University of the East Ramon Magsaysay Memorial Medical Center, Inc., the Community Extension and Social Action Unit (UERMMMCI-CESAU) initiated an inter-professional community nutrition program to answer the nutritional deficiencies in a pediatric population in the adopted community in Southville 8B Homes, Phase IV, Barangay San Isidro, Rodriguez, Rizal.

The purpose of this study was to measure the impact and outcome of an inter-professional community nutrition program called as “*NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon.*” The health outcome evaluation consisted of a process, outcome and impact evaluation.

### **Program Description**

The pilot project of “*NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon*” was initiated by the UERMMMCI College of Medicine (COM) – Multi-Disciplinary Urban Community Health Services Extension Program (MUCHSEP) in 2009 under the leadership of the Department of Preventive and Community Medicine (DPCM).<sup>2</sup>

The processes followed in the *NUTRI-CHIKA* program were based on the principles in community-oriented primary care (COPC) by Kark.<sup>3</sup> Program development started with the examination of data gathered through community diagnosis. The prioritization process that followed confirmed that malnutrition was a “felt need” of the community stakeholders and ought to be addressed. Subsequent stages included planning the program’s blueprint. Its

implementation focused on the collaborative process of empowering mothers of the malnourished children. Subsequently, a review of the program was planned and conducted. Its heart was focused on capacity-building of mothers and primary caregivers of identified malnourished children through improvement of their basic nutrition knowledge and practices, by entrusting to them the responsibility of planning, preparing meals, and feeding their malnourished children. All these transpired in a setting of an underserved and resource-limited community.

The program was a quadripartite cooperation among UERMMMCI, the Southville 8B Phase IV Home Owners Association (HOA), Rotary International (Metro West Triangle), and the Sangguniang Bayan ng Rodriguez Rizal (i.e., local government unit / LGU). The HOA provided the social and community mobilization especially during the preliminary phase of the program. The Rotary International managed the finances of the program. The LGU allocated nutritional bars given to the malnourished children to supplement the daily meals. UERMMMCI was at the helm of the technical and manpower support for the actual implementation of the program.

For the multi-disciplinary and inter-professional component of the program, the following were accomplished. The UERM Memorial Hospital (UERMMH) Community Medicine post-graduate interns (PGI) and the faculty of the COM identified and enrolled malnourished children in the *NUTRI-CHIKA* program. The Dietary Section of UERMMH prepared a daily caloric build-up lunch meal plan for the children, given daily from Monday to Thursday. Volunteer community health workers (CHW) and mothers of the malnourished children were given novel and inter-active learning modules by the College of Nursing (CON) faculty and students on proper food handling and preparation, food equivalents-exchanges and awareness of prevalent food myths. The CHWs and the mothers were responsible for doing the market purchases, actual food preparation within the health facility, as well as feeding of the rationed food meals to the children. While the CHWs and mothers prepared the food, the children were also introduced to different learning-play sessions, conducted by the Community Medicine PGIs, which stimulated cognitive development. Congruent to this, regular physical activities by the College of Allied

Rehabilitation Sciences (CAREs) also helped enhance their physical development.

In the second quarter of 2017, an anthropometric survey was conducted throughout the whole community of Southville 8B Phase IV. This served as a screening process to identify the underweight children in the area. It was then followed by a more accurate means of assessing the children's anthropometric measurements, classifying them into the various categories of malnutrition. A community caucus was held, with the program organizers meeting the mothers of the identified malnourished children. Preliminary briefing and planning sessions were conducted, and the proposed program expectations, mechanics, and desired outcomes were discussed among all stakeholders. After interactive dialogues on their corresponding responsibilities, consent to participate was elicited. Thereafter, 40 children and their mothers were initially enrolled to the program. The mothers were organized, and their leaders were elected; nutrition teams were formed and given specific tasks. Among their responsibilities were the following: 1) participation in the nutrition education sessions; 2) preparation of the budget and meals; 3) doing the kitchen chores; and 4) feeding the children. The nutrition teams likewise managed the finances provided by Rotary International, purchased the ingredients and raw materials for the meals, and prepared the various viands based on the Dietary Section caloric build up meal plan. Concomitantly, six nutrition education sessions were conducted aimed at improving knowledge of the mothers and primary caregivers related to proper nutrition. The actual preparation of meals and feeding sessions served as the venue for the application of proper nutrition practices. In addition, regular meetings with the mothers and primary caregivers threshed out problems encountered in the implementation of the *NUTRI-CHIKA* program, and these opportunities allowed the detection of changes in their nutrition related practices.

The malnourished children were given supplementary lunch meals four times a week for a total duration of six months. One supplementary nutrition bar with each lunch meal was also served. Weight and height were measured at the start and every four weeks during the feeding months. The proportion of the food consumed by each child, illnesses present and absenteeism were noted every session.

## Methods

### *Study Design*

A mixed quantitative-qualitative health outcome evaluation was used. The quantitative part consisted of a longitudinal observational study design, which reviewed the data of the children who received the nutritional intervention. The qualitative study was done with a phenomenological approach, using a thematic analysis for the process and impact evaluation by means of a focus group discussion and key informant interviews.

### *Data Sources*

For the outcome evaluation, the actual data collected during the implementation of the program were reviewed and analyzed. For the process and impact evaluation, focus group discussions (FGD) and key informant interviews (KII) were conducted.

### *Population and Setting*

To determine the impact of the *NUTRI-CHIKA* program, the target population included the CHWs, parents and primary caregivers of those who participated in the nutrition program and the leaders in the community. For the outcome evaluation, a review of the records of the children who were given the nutrition program was undertaken.

### *Data Collection*

The data of the malnourished children enrolled to the nutrition program were reviewed and analyzed. Since the data were already taken by the researchers during the implementation of the program and consent was already taken by CESAU prior to their inclusion of the program, there was no breach of data privacy of the children's data. The FGDs and KIIs were done for the process and impact evaluation. This was done after the participants signed an informed consent detailing the research process.

## Data Analysis

### *Quantitative*

Summary statistics for continuous variables included total frequency, mean and standard

deviation. Summary statistics for discrete variables were presented in terms of absolute and relative frequencies. Monthly change in weight and height were assessed using repeated measures analysis of variance (ANOVA). Frequency table was used to determine the proportion of children who had a one-degree change in nutritional status. McNemar’s change test was used to determine improvement rate in nutritional status. Statistical analysis of all data was performed using Graph Pad Version 5.

*Qualitative*

Thematic analysis was done to process the data collected from the focus group discussion and key informant interview. Memoing was conducted while collecting the data. Once data had been saturated, coding was done to identify key words, concepts, images and reflections. From the coding, the researcher identified themes and sub-themes or patterns that emerged from the coded data. After this, the researchers finalized the name of each theme, wrote its description and illustrated it with a few quotations from the original text to help communicate its meaning to the reader.

**Sample Size**

Data collection proceeded until data saturation was observed.

**Results**

*Outcome Evaluation*

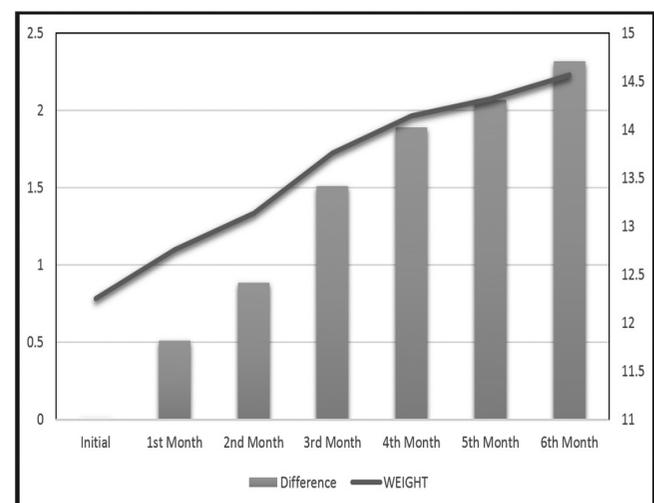
Initially, 49 children were included in the “NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon” Feeding Program of the UERMMMCI-CESAU (Table 1). There were 25 girls and 24 boys. The average age at the start of the feeding program was 62 months. The average weight was 12.09 kg. Three children defaulted during the first month and another three children subsequently transferred residence.

Except for the first month, there was a significant improvement ( $p < 0.001$ ) in weight every month for the participants (Table 2). There was an average of 2.32 kg statistically significant ( $p < 0.001$ ) increase in weight from the initial baseline weight to the weight

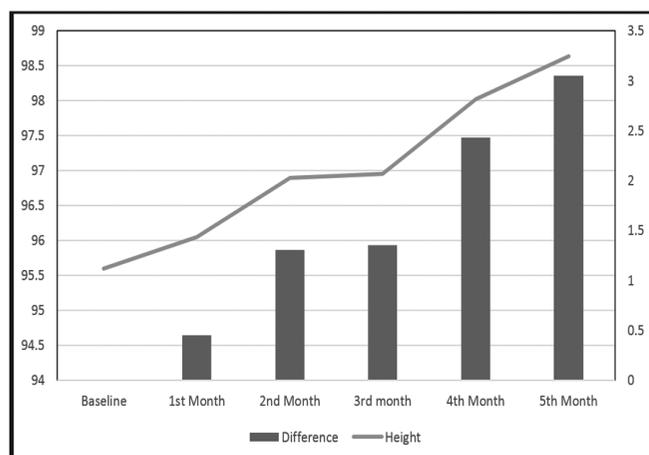
of the children at the fifth month of feeding, which clearly showed that the NUTRI-CHIKA program was successful in improving the weight of the children (Figure 1). Table 3 showed that there was a significant increase ( $p < 0.001$ ) in the height of the children on each monthly measurement. There was a statistically significant increase in height ( $p < 0.001$ ) from the baseline to the fifth month of feeding averaging 3.05 cm, which clearly showed that the feeding was effective in increasing the height of the children (Figure 2).

**Table 1.** Baseline demographic characteristics of the participants.

Demographic characteristics	N (%)
Sex	
Male	24 (49)
Female	25 (51)
Average age (mo)	62 ± 36
Degree of malnutrition	
Severe malnutrition	18 (37)
Moderate	14 (29)
Mild	12 (25)
Normal	4 (8)
Obese	1 (2)
Average weight (kg)	12.09 ± 4.02
Average height (cm)	95.60 ± 12.04



**Figure 1.** Weight improvement per month with the average weight per month.



**Figure 2.** Improvement in height per month with the average height per month.

In terms of Z-scores, 32 children graduated with an increase in the Z-score ranging from one to three degrees improvement (Table 4). For those who had no change in the Z-score, four started as normal and ended up as normal. Only one participant's nutritional status deteriorated, where the Z-score worsened from mild to severe malnutrition. Overall, 76.19% of the participants showed significant improvement in the degree of malnutrition from the baseline, which was the prime objective of the feeding program.

**Table 4.** Change in the nutritional status of children from the baseline.

Change in Z-score value	Frequency (%)
No change	9 (21.43)
1-degree improvement	17 (40.48)
2-degree improvement	12 (28.57)
3-degree improvement	3 (7.14)
Worsened	1 (2.38)

There was a statistically significant odds ( $p < 0.001$ ) that those who participated in the feeding program were 32 times more likely to have an improvement in their nutritional status (Table 5).

*Process Evaluation*

Regarding the participants' perceived best practices of the *NUTRI-CHIKA* program, most reported the good disposition the healthcare team (e.g., doctor, nurses, faculty, students, etc.) exhibited while implementing the program. Specifically, the participants noted their behavior to be: 1) attentive; 2) persevering, especially in teaching children about proper nutrition, and 3) kind.

Difficulties in the implementation of the program were encountered which focused mostly on the practices, daily habits and attitudes of the program participants and their families. Most of the participants

**Table 2.** Monthly change in weight of children using repeated measures analysis of variance.

SMonths	Average weight (kg)	Increase in weight (kg)	P-value
Baseline	12.25		
1st month	12.76	0.51	0.176
2nd month	13.14	0.88	< 0.001
3rd month	13.76	1.51	< 0.001
4th month	14.14	1.89	< 0.001
5th month	14.32	2.07	< 0.001
6th month	14.57	2.32	< 0.001

**Table 3.** Monthly change in height of children using repeated measures analysis of variance.

Months	Average height (cm)	Increase in height (cm) (95% CI)	P-value
Baseline	95.59		
1st month	96.05	0.45 (-8.71, 9.61)	0.021
2nd month	96.90	1.31 (-7.85, 10.47)	< 0.001
3rd month	96.95	1.36 (-7.80, 10.52)	< 0.001
4th month	98.02	2.43 (-6.73, 11.59)	< 0.001
5th month	98.64	3.05 (-6.11, 12.21)	< 0.001

**Table 5.** Improvement rate of the participant in terms of nutritional status.

	Improved	Unimproved	Odds ratio (95% CI)	P-value
Normal Z-scores at baseline	4	1	32.00 (5.34, 1302.93)	< 0.001
Abnormal Z-scores at baseline	32	5		

\* McNemar's change test

noted that their tasks at home were the main hindrance as to why they were not able to participate in the *NUTRI-CHIKA* program arrangements, particularly on how cleanup was to be done after the feeding program. No problems were encountered on the part of the healthcare professionals. Side questions, which included the appropriateness and adequacy of the materials and equipment, were also asked in line with this question. To these questions, the participants mentioned that such materials and equipment were adequate and appropriate, though some kitchen materials went missing after the feeding program was implemented. The missing bowls were noted during the inventory of kitchen materials, which was done before and after the feeding program was implemented.

#### *Impact Evaluation*

The participants also reported that, due to the positive behaviors of the nurses and doctors, the children enrolled in the *NUTRI-CHIKA* program did not only become healthier in terms of their anthropometric measurements, but in their general disposition as well. The main lessons that were inculcated to the participants after the implementation of the program included genuine concern for the children's knowledge, attitudes, and practices on health and nutrition, as well as on good manners and right conduct. Specific responses elicited from the mothers and primary caregivers included:

1. There was better orientation of the children towards more nutritious food choices.
2. Mothers and primary caregivers realized the importance of properly preparing the right amount or serving of nutritious food for their children.

There was emphasis on family values, which focused on parents giving more quality time for their children and teaching them to socialize and be courteous.

As to the impact of the program to their daily lives, the participants stated that aside from the improvement in the health of their children, in terms of their weight and height, they also noted that the children did not get sick as often. The mothers also alleged that they now knew how to make better food choices for their children. They also added that it was much easier for their children to socialize and that the children exhibited well-mannered decorum and behavior. These values and lessons were also what the participants perceived to be the main impact of the *NUTRI-CHIKA* program to their community.

Overall, the participants highly lauded the *NUTRI-CHIKA* program and recommended the further implementation of this program, since it provided a holistic impact to children in the improvement of their physical and social well-being. A recommendation was raised to possibly include children with disabilities in the program by making the necessary amendments to the current *NUTRI-CHIKA* program plan to incorporate this group of vulnerable children.

#### **Discussion**

Numerous programs have been formulated by the government to address the nutritional situation of the country, foremost of which is the Philippine Plan of Action for Nutrition (PPAN) 2017-2022.<sup>4</sup> The PPAN consists of 12 programs and 46 projects, serving as a framework for actions that can be undertaken by member agencies of the National Nutrition Council (NNC), other national government agencies, local government units, non-

government organizations, academic institutions, and development partners.

Other pertinent nutrition programs being implemented by government and non-government organizations in the Philippines include the Lalakas ang Katawang Sapat sa Sustansiya (LAKASS program), Gulayan sa Paaralan, and Responsive Action for Integrated Nutrition (RAIN).<sup>5,6</sup> These programs have shown varying results as to their outcome and impact in the community, although one particular program evaluation showed a negative outcome.<sup>7</sup>

“*NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon*” is a unique program in as much as it involves a quadripartite collaboration among an academic institution, the local government unit, the homeowners’ association (HOA), a non-government organization, and the community itself. It also boasts of an inter-professional component, consisting of at least four different academic units and professions, cooperating toward the successful implementation of the program.

The program focused not only on feeding the children, but more importantly on behavior modification on the part of the mothers and primary caregivers to be able to catalyze change in their attitude and practice towards the nutrition of their children through an innovative and immersive health education program. The health component focused not only on the nutritional needs of the children, but also on their cognitive and physical development through regular interactive play learning sessions and physical exercise, respectively.

#### *Outcome Evaluation*

Numerous programs and studies have clearly shown that feeding projects, with or without the other facets of the *NUTRI-CHIKA* program, often resulted in improvement in the nutritional status of children.<sup>8-10</sup> This study demonstrated a statistically significant increase in weight and height of the participants. In terms of Z-scores, 32 out of 49 children graduated with at least 1 to 3 degrees improvement in their Z-scores. The significant change in weight surpassed most of the other program reports after six months of intervention and implementation. Pooled intervention, observed in selected third world countries in terms of complementary feeding and education programs, showed a mean difference in weight of only

0.25 kg.<sup>11</sup> The previous *NUTRI-CHIKA* program done in Quezon City in 2009 showed an absolute mean change in weight of 1.85 kg, compared to the observed mean change of 2.32 kg of this present *NUTRI-CHIKA* program. This could be attributed to the addition of the holistic multi-disciplinary and inter-professional approach of the intensified program, which also inculcated cognitive and physical development, as compared to the original 2009 *NUTRI-CHIKA* program, which was primarily an endeavor exclusively of the COM. The change in height also surpassed that of the aforementioned pooled intervention study, which showed only a 0.54 cm mean increase in height but was inferior to the original 2009 *NUTRI-CHIKA* program, which recorded a 4.0 cm mean increase in height of its participants.

The 2009 *NUTRI-CHIKA* program evaluation focused on the additional effect of nutrition education on the improvement of the height and weight of the children, as shown by the improvement in the post-test scores (i.e., via written and objective structured skills exams) of mothers when it comes to nutrition. However, in this particular program, there were no pre-test and post-test exams given to the mothers and primary caregivers to assess the gain in level of knowledge. However, the FGDs and KIIs showed that there was a change in the attitude not only of the mothers, but the children as well when it came to healthy food choices. Mothers were able to prepare healthy food choices with vegetables, and the children eventually learned to consume these healthy food choices, with minimal resistance. This could be attributed not only to the nutrition education given to the mothers and primary caregivers, but to the nutrition education given to the children as well, which was an added feature of the new *NUTRI-CHIKA* program.

The *NUTRI-CHIKA* program reported that 76.19% of the participants exhibited a significant decrease in the degree of malnutrition from the baseline. This was above the 70% improvement target objective of the School-Based Feeding Program (SBFP) of the Department of Education, which achieved 62% improvement.<sup>12</sup> This was also higher than the results of the LAKASS Program, which demonstrated significant improvements in the nutritional status of malnourished children (i.e., using weight-for-age parameters), by as much as 71.4% and 46.6% in severe and moderately underweight cases.<sup>5</sup>

### *Process Evaluation*

The positive feedback and affirmative evaluation of *NUTRI-CHIKA* may be construed to be a good indicator that the program implementation went according to all the necessary planning arrangements. The achievement of the expected outcomes of the program was a benchmark for its further success. One setback in the *NUTRI-CHIKA* implementation was the general behavior of a few mothers, whose main dilemma was the inability to participate actively due to parental responsibilities to other children who were not part of the CESAU feeding program. Some mothers opined that it was impractical to join the *NUTRI-CHIKA* program, while a few even verbalized that the mere attendance to the series of learning modules was a difficult task to complete and comply with. These sentiments stemmed from the fact that the daily cooking and feeding process of the *NUTRI-CHIKA* program coincided with the actual preparation of lunch meals in the respective homes. Nonetheless, this was countered by other participant mothers and primary caregivers who volunteered to cook, serve and feed all children enrolled in the *NUTRI-CHIKA*, even for those whose mothers could not join the actual feeding session.

Implementation of the *NUTRI-CHIKA* program proved to be timely and relevant, as global and national reports underscored the problem of malnutrition. Though interventions had been implemented, some health experts expressed concern that such programs were not made in sweeping initiatives. According to the 2018 Global Nutrition Report, worldwide nutrition initiatives were characterized to be too slow and did not spread across all forms of malnutrition.<sup>13</sup> Thus, some completed and on-going public health programs, such as the community-oriented *NUTRI-CHIKA* project, had been facilitated in support of and aligned with PPAN 2017-2022, which called for the development of nutrition programs throughout the Philippine archipelago.

### *Impact Evaluation*

An interesting and relevant finding demonstrated by the *NUTRI-CHIKA* program was how the malnourished children improved not only in their physical attributes, but also in their emotional and social well-being. Specifically, children enrolled in the *NUTRI-CHIKA* program presented with better

disposition, higher regard for proper nutrition, and greater ability to socially engage with other children. A study conducted by Henningham found that undernourished children exhibited differences in terms of their temperament traits: these children tended to be: 1) less sociable, 2) less attentive, 3) more fearful, and 4) more emotionally negative, as compared to well-nourished children.<sup>14</sup> This could be a plausible explanation for the change in behavior of the *NUTRI-CHIKA* children.

Furthermore, a typical Filipino family, although shifting its context in modern civilization, has retained the old values it is known for. A Filipino family is viewed as an institution, the very basic social unit, that adopts strategies variably in response to structural, cultural and ideological forces in society.<sup>5</sup> In this regard, if an intervention that changes health-seeking attitudes and practices is targeted toward the Filipino family, the family will most likely respond by changing its ideals and norms to adapt and employ the changes birthed by the program. This is evident in the findings that indicate that change has happened not only in the children, but in their families as well, because the parents saw the value of good nutrition in improving the lives of their children.

### **Conclusion**

The "*NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon*" program proved to be a success, based on the quantitative and qualitative evaluation done by the investigators. Positive change was evident, and this was not only exhibited in the physical dimension (i.e., weight and height), but also on the social well-being of the children. Family members likewise demonstrated behavioral change, and better perceptions on health and proper childhood nutrition had been elicited. Though there were minor setbacks in the implementation of the *NUTRI-CHIKA* program (i.e., conflict in schedule of the mothers), the program over-all was able to achieve its objectives in the time given. In the event the *NUTRI-CHIKA* program will be implemented in a different resource-limited community in the future, addressing these issues may further enhance the program.

### **References**

1. Food and Nutrition Research Institute 8th National Nutrition Survey [Internet]. 2015. [Accessed 2019 Jan 4]. Available from: [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph).

2. NUTRI-CHIKA: Usapan Tungkol at Para sa Nutrisyon - A program review. *UERMCCI Health Sci J* 2012; 1(1): 40-8.
3. Kark SL. *The practice of community-oriented primary care*. New York: Appleton-Century-Crofts, 1981.
4. Philippine Plan of Action for Nutrition 2017-2022 [Internet]. [Accessed 2019 Jan 4]. Available from: <http://www.nnc.gov.ph/downloads/technical-papers?download=870:philippine-plan>.
5. Philippine Case Study: LAKASS Programme Annex 3(B) [Internet]. [Accessed 2019 Jan 4]. Available from: <http://www.fao.org/docrep/006/Y5030E/y5030e16.htm>.
6. Molijon AL, de la Rama JM. Baseline assessment of vegetable gardens (gulayan sa paaralan) in public elementary and secondary schools. *JPAIR Institut Res [S.I.]* [Internet]. 2014 [Accessed 2019 Jan 4]; 4(1): 64-75. Available from: <http://philair.ph/publication/index.php/irj/article/view/307>. doi: <https://doi.org/10.7719/irj.v4i1.307>
7. Akin JS, Guiskey DK, Popkin BM. The school lunch program and nutrient intake: A switching regression analysis. *Am J Agric Econ* 1983; 65: 477-85.
8. Hamilton WL, Rossi PH. Effects of food assistance and nutrition programs on nutrition and health / FANRR. Economic Research Service, US Department of Agriculture.
9. Gartner A, Maire B, Kamlea Y, Traissac P, Delpuech F. Process evaluation of the Senegal community nutrition program, data management and statistics analysis. *Trop Med Int Health* 2006 Jun; 11(6): 955-66.
10. Appoh LY, Krekling S. Maternal nutritional knowledge and child nutritional status in the Volta Region of Ghana. *Matern Child Nutr* 2005; 1: 100-10.
11. Imdad A, Yakoob MY, Bhutta ZA. Impact of maternal education about complementary feeding and provision of complementary foods on child growth in developing countries. *BMC Public Health* [Internet]. 2011; 11(Suppl 3): S25. Available from: <http://www.biomedcentral.com/1471-2458/11/S3/S25>.
12. Tabunda AL, Albert JR, Angeles-Agdeppa I. Results of an impact evaluation study of DepEd's school-based feeding program [Internet]. [Accessed 2019 Mar 15]. Available from: <https://psa.gov.ph/sites/default/files/Session%202018%20Results%20of%20an%20Impact%20Evaluation%20Study%20of%20DepEd%27s%20Schhol-based%20Feeding%20Program.pdf>.
13. 2018 Global Nutrition Report: Shining a light to spur action on nutrition (Executive Summary). Development Initiatives Poverty Research Ltd., 2018.
14. Baker-Henningham H, Hamadini JD, Huda SN, Grantham-McGregor S. Undernourished children have different temperaments than better-nourished children in rural Bangladesh [Internet]. 2009 [Accessed 2019 Feb 20]. Available from <https://academic.oup.com/jn/article/139/9/1765/4670542>.
15. Parrenas RS, cited in Zhou M, Ocampo AC. *Contemporary Asian America, 3rd Edition: A multi-disciplinary reader* [Internet]. 2006 [Accessed 2019 Feb 20]. Available from: <https://books.google.com.ph/>

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# Knowledge, attitude and practices (KAP) of nursing staff regarding depressive disorders in a private hospital in Quezon City, Philippines

Hecil A. Cruz, MD and Melissa Paulita V. Mariano, MD

## Abstract

**Introduction** There is limited data regarding the knowledge, attitudes and practices (KAP) of nurses towards psychiatric disorders in the Philippines. Hence, this study aimed to assess the KAP of nursing staff in a tertiary hospital on depressive disorders and determine differences in their KAP in relation to sociodemographic variables.

**Methods** The study, which involved 116 Filipino nurses, was divided into two phases. Phase 1 was the creation and validation of a KAP questionnaire, and Phase 2 was a descriptive cross-sectional study to determine the KAP of the nurses using the validated questionnaire. Frequencies and differences in KAP scores in relation to sociodemographic variables were analyzed using independent t-test, ANOVA and chi-square via SPSS v.24. Ethics approval was secured for both phases of the study.

**Results** The questionnaire was validated after two rounds of expert validation. Phase 2 results revealed that the mean knowledge of nurses was lower than expected. They had overall good attitudes, with nurses without previous mental health work experience having higher attitude scores towards functioning and prognosis. However, specific negative attitudes were noted. Overall, good practices were also noted, with 42.2% of the sample having had encountered a depressed patient at work and male nurses having higher practice scores compared to females.

**Conclusion** The nurses had overall good attitude and practices, but still had inadequate knowledge and some negative attitudes towards depressive disorders. This signifies the need for continuing mental health education among nursing staff in the Philippines.

**Keywords:** knowledge, attitude, practices, nurses, depressive disorders

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### Correspondence:

Melissa Paulita V. Mariano, MD, Department of Psychiatry, University of the East Ramon Magsaysay Memorial Medical Center Inc., 64 Aurora Boulevard, Barangay Doña Imelda, Quezon City, PH 1113; e-mail: mvmariano@uerm.edu.ph

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Department of Psychiatry, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

Psychiatric disorders were found to be the leading cause globally of years lost due to disability (YLD) and majority of this is accounted for by depressive disorders.<sup>1</sup> Depressive disorders are associated with increased morbidity and mortality, and suicide, a devastating consequence of these disorders, is a major cause of early mortality in the Western Pacific Region.<sup>2,3</sup> Despite these consequences, depression and other psychiatric disorders often remain unnoticed and consequently untreated due to competing health problems, lack of resources and psychiatric training for health workers, and social stigma, and this is more

common and has greater impact in low-income and less-developed countries.<sup>4,5</sup>

Identification of psychiatric disorders has proven to be difficult for health professionals from other fields, which may be due to social stigma and lack of adequate knowledge about these disorders.<sup>6,7</sup> Furthermore, even practitioners with sufficient knowledge about psychiatric disorders may have a tendency toward misdiagnosis due to stigma and negative attitudes towards psychiatric patients.<sup>8</sup> Stereotypes against psychiatric patients include beliefs that patients have low intelligence and are dangerous, and that they suffer from these disorders due to self-inflicted problems, familial defects, or possession by evil spirits.<sup>9</sup> Although awareness regarding psychiatric disorders has been increasing, non-psychiatric health professionals still have the perception that psychiatric patients are inferior to the general population, which may be due to lack of knowledge, or a negative attitude despite adequate knowledge.<sup>6,10</sup>

There is a relative scarcity of data about the knowledge, attitudes and practices towards depression among non-psychiatric health professionals, who are often the first point of contact of patients with depressive disorders. Among the health professionals, nurses are often the ones directly involved in patient care and spend time interacting with patients and their relatives. The knowledge and attitudes among nurses may vary among different countries and may depend on the training received or exposure to patients with mental disorders. Some studies showed that nurses have low recognition and underestimation of severity of depression in the elderly patients.<sup>11,12</sup> Other studies showed that nurses commonly perceive psychiatric disorders to be caused by biochemical disturbances, financial constraints and heritability.<sup>12-15</sup> In a Nepalese study by Shyangwa, nurses perceived psychiatric patients to be “insane”, unable to maintain good relationships and have difficulty in taking care of themselves and their families.<sup>15</sup> However, nurses expressed no problems working and interacting with them. Another study by Gurung found that nurses perceived mental illness as non-contagious and treatable, and that psychiatric patients were “not mad” and need not be admitted in a mental hospital.<sup>13</sup> Also, nurses had no problems maintaining social relationships with these patients and that they were not ashamed of a family member being a psychiatric patient. However, most of them did not visit a psychiatrist when they experienced emotional problems.

On the other hand, a study done by Deribew found that nurses generally considered major depressive disorder as a minor disease.<sup>14</sup> One out of 10 nurses in the study did nothing for patients whom they recognized to have major depressive disorder, as they perceived the disorder to be less severe and that special training for the nurses is needed in the provision of psychiatric care. Majority of the nurses in the study believed that patients with major depressive disorders should be managed accordingly in a hospital alone, but they showed positive attitudes regarding the chance of cure and ability for self-care and family care of these patients. Majority also showed positive views towards employment opportunities, marriage prospects and future social relations of patients with depressive disorder.<sup>15</sup> However, in a study by Brinn, nurses generally expressed fear towards the possible unexpected behavior of these patients.<sup>16</sup>

Age, nursing experience, prior training for psychiatric disorders and education were the identified factors that affect knowledge, attitude and behavior of non-psychiatric health professionals towards depression, while sex and setting did not. In particular, it has been shown that awareness of the need for proper assessment of psychiatric disorders decreases as the age of the nurses increases. Specifically, a higher proportion of nurses belonging to the 20-30 year old age group were aware of the need for an adequate assessment for psychiatric patients.<sup>17</sup> Finally, it has been shown that nurses with less than five years of experience tended to label patients with major depressive disorder as being “dangerous”.<sup>14</sup>

In the Philippines, there is relative lack of data regarding the knowledge, attitudes and practices of nurses towards patients with psychiatric disorders. Hence, the general objective of the study was to assess the knowledge, attitude and practices (KAP) of the nursing staff of the University of the East Ramon Magsaysay Memorial Medical Center, Inc. (UERMMMCI) on depressive disorders. Specific objectives include the following: 1) to validate a newly developed KAP questionnaire on depressive disorders for use among nurses and 2) to determine the differences of the knowledge, attitudes, and practices on depressive disorders in relation to the age, sex, previous work experience in a psychiatric institution, family history of psychiatric disorder, and years of experience of the nursing staff.

Results of this study may contribute to the relative lack of local data regarding mental illnesses and the

knowledge, attitude and practices towards them by health workers. The findings may be used for health policy formulation and service delivery for patients suffering from depressive disorders.

## Methods

This was a two-part study, with Phase 1 being the creation and validation of a KAP questionnaire, and Phase 2 being a descriptive cross-sectional study to determine the KAP of nurses on patients with depressive disorders using the questionnaire created. For Phase 1 of the study, subjects constituted an expert panel based on the recommendation of the International Society for Pharmacoeconomics and Outcomes Research (ISPOR). This included seven senior nurses from the Psychiatry Ward. For the pilot testing, 30 staff nurses of UERMMMCI were invited per ISPOR recommendation. The 30 subjects were also included in Phase 2 of the study. For Phase 2, 137 staff nurses working in UERMMMCI were recruited via random sampling, as this was the minimum sample size computed using OpenEpi Ver 3 Sample Size Calculator based on 95% confidence interval and finite population correction factor for a total population of 210. Inclusion criteria were as follows: clinical staff nurses who are working in the different wards of the hospital and are directly involved in patient care. The self-administered survey was implemented over a four-week period and was conducted at UERMMMCI, a private tertiary hospital in Quezon City, Philippines.

A structured questionnaire was developed after a focus group discussion with the senior staff nurses of the UERMMMCI Psychiatry Ward with the following content: sociodemographic information; knowledge of the epidemiology and etiology, signs and symptoms, course and management of depressive disorders; attitude and practices towards patients with depressive disorders. The questions in the knowledge part consisted of 10 multiple choice items based on a textbook on psychiatric mental health nursing.<sup>18</sup> The questions in the attitude part were based on a similar study by Deribew and divided into two parts with five items each: the first part pertaining to attitudes towards evaluation and treatment, and the second part pertaining to attitudes towards functioning and prognosis.<sup>14</sup> Eight items were developed for the practices part, and a case vignette depicting common signs and

symptoms included in DSM 5 criteria was included to determine proportion of respondents who encountered a similar patient during work.

After the questions were finalized, seven senior nurses from the Psychiatry Ward were invited to validate the questionnaire; the content validity indices (CVI) were determined. The questionnaire was then further revised and a second round of validation was done. The final questionnaire was then administered to 30 clinical nurses during the pilot testing. Comprehension index was determined and cognitive interviews were done to determine qualitatively other perceived problems in the questionnaire. After the final questionnaire was deemed acceptable, test-retest reliability was determined using Pearson's correlation coefficient for the knowledge part, while Spearman's rho was used for the test-retest reliability of the attitude and practices part. The final version of the questionnaire was then used for the Phase 2 of the study.

The questionnaires were distributed among the respondents for self-administration. For the knowledge part of the questionnaire, the previously mentioned expert panel was asked to set a minimum passing score. Attitudes of the staff nurses towards depressive disorders were assessed using a four-point scale: 1 - strongly disagree, 2 - disagree, 3 - agree, 4 - strongly agree or 1 - very poor, 2 - poor, 3 - good, 4 - very good. For the nurses' attitudes towards evaluation and treatment, attitude was considered positive if answers were 1 and 2 for negative statements, and 3 and 4 for positive statements. For the attitudes towards functioning and prognosis, attitude is considered negative if answers are 1 and 2 for negative statements, and 3 and 4 for positive statements. The scores of the respondents were summated on each attitude subscale. The respondent was deemed to have a positive attitude when the summated score was more than 10, and negative, for scores of 10 and below.

The practices of the nurses towards depressive disorders were assessed by determining the frequency of what they usually do when they encounter patients similar to a depressed patient depicted in the case vignette. This was determined using a four-point scale: 1 - never, 2 - seldom, 3 - often, 4 - always. Practice was considered good if answers were 1 and 2 for negative statements and 3 and 4 for positive statements. The scores were then summated, and a respondent was considered as having good practice when scores were more than 17.

Data gathered was managed and analyzed using SPSS 24. Missing data were excluded in the data analysis. Descriptive statistics were summarized using means, frequencies and proportion. The knowledge, attitude and practice scores were analyzed using independent t-test and ANOVA to determine differences in relation to sociodemographic variables, i.e., age range, sex, years of experience in the nursing service, history of work experience in a psychiatric institution and family history of psychiatric disorder. Chi-square was used in order to describe the differences in the frequencies of the respondents' specific attitudes and practices regarding depressive disorders in relation to the sociodemographic variables.

This study was approved by the Ethics Review Committee of UERMMMCI. Informed consent was obtained from each of the participants, who were given the option to withdraw anytime during the study. Measures were taken to ensure the privacy of the participants and confidentiality of the information they provided.

## Results

During the first round of validation, two questions each in the knowledge and attitude part and one question in the practices part failed based on expert opinion. Items were revisited and discussed with the expert panel along with other problems in the questionnaire. The questionnaire was revised and a second round of validation was done, which revealed high CVI on all the criteria. A minimum passing score of five was set by the expert panel. The comprehension index was high for all items in the questionnaire, and there were no further problems noted in the questionnaire by the respondents during the cognitive interviews. Test-retest reliability of the knowledge ( $r = 0.763$ ,  $p < 0.001$ ), attitude ( $r = 0.739-0.816$ ,  $p < 0.001$ ) and practices ( $r = 0.857$ ,  $p < 0.001$ ) part of the questionnaire was determined to be acceptable.

A total of 137 nurses were invited to participate in the study and 116 questionnaires were retrieved -- a response rate of 84.67%. Majority of the respondents were female (70.7%), aged 20 to 30 years (60.3%), with 1 to 5 years of experience in the nursing service (41.4%), no previous working experience in a psychiatric institution (92.2%) and no family history of depressive or psychiatric disorders (67.2%) as shown in Table 1.

**Table 1.** Sociodemographic profile of the respondents.

Variables	Number (%)
Sex	
Male	27 (23.3)
Female	82 (70.7)
Did not answer	7 (6.0)
Age (yr)	
20-30	70 (60.3)
31-40	20 (17.2)
>40	10 (8.6)
Did not answer	16 (13.8)
Experience in nursing service (yr)	
<1	12 (10.3)
1-5	48 (41.4)
>5	16 (13.8)
Did not answer	40 (34.5)
With previous experience in a psychiatric institution	
Yes	8 (6.9)
No	107 (92.2)
Did not answer	1 (0.9)
With family history of depressive or other psychiatric disorder	
Yes	18 (15.5)
No	78 (67.2)
Not sure	19 (16.4)
Did not answer	1 (0.9)

### *Knowledge of Depressive Disorders*

Half of the respondents obtained a passing score out of the eight items used to assess their knowledge of depressive disorders. The mean knowledge score of the respondents was 4.38, which was lower than the predetermined minimum passing score of five (Table 2). Among the socio-demographic factors studied, the knowledge of nurses on depressive disorders only differed significantly in terms of presence of family history of psychiatric disorder. Those with no family history of psychiatric disorder had significantly higher scores than those with family history ( $p = 0.036$ ) as seen in Table 3.

### *Attitude on Depressive Disorders*

The nurses had overall good attitude with higher scores for attitudes towards functioning and prognosis of the depressed patients (Table 2). Majority of the respondents had good attitudes towards evaluation

## Knowledge, attitude and practices of nursing staff regarding depressive disorders

**Table 2.** Mean scores of the knowledge, attitude and practices of nursing staff.

Domain	Mean Score $\pm$ SD
Knowledge	4.38 $\pm$ 1.297
Attitude	
Evaluation and management	10.22 $\pm$ 1.566
Functioning and prognosis	12.55 $\pm$ 1.644
Practices	21.53 $\pm$ 2.678

and management of depressive disorders. However, majority of the respondents perceived patients with depressive disorders to be dangerous and unpredictable and that special training is needed in order to deal with such patients (Table 4). In terms of functioning and prognosis of patients with depressive disorders, majority of the nurses had good attitudes (Table 4). There were no significant differences in the overall scores of the nurses' attitudes towards evaluation and management of patients with depressive disorders in

**Table 3.** Knowledge scores of nurses in relation to sociodemographic variables.

Sociodemographic Variable	Mean Score $\pm$ SD	Test Statistic	Sig
Age (yr)		F = 2.942	0.057
20-30	4.44 $\pm$ 1.163		
31-40	4.60 $\pm$ 1.231		
>40	3.58 $\pm$ 1.564		
Sex		t = 0.934	0.352
Male	4.63 $\pm$ 1.182		
Female	4.37 $\pm$ 1.301		
Experience in nursing service (yr)		F = 0.063	0.969
<1	4.58 $\pm$ 0.996		
1-5	4.48 $\pm$ 1.220		
>5	4.41 $\pm$ 1.583		
Previous work experience in a psychiatric institution		t = 0.228	0.820
Yes	4.50 $\pm$ 0.756		
No	4.39 $\pm$ 1.316		
With family history of psychiatric disorder		t = 2.129	0.036*
Yes	3.83 $\pm$ 1.150		
No	4.51 $\pm$ 1.235		

\*significant at  $p < 0.05$

**Table 4.** Attitude of the respondents on the evaluation and management, and functioning and prognosis of patients with depressive disorders.

Area of Concern/Attitude	Positive No (%)	Negative No (%)
Evaluation and management		
Patients with depressive disorders are considered to have minor illnesses	79 (68.1)	37 (31.9)
Patients with depressive disorders are dangerous and unpredictable	32 (27.6)	84 (72.4)
Special training is needed in order to deal with patients with depressive disorders	14 (12.1)	102 (87.9)
Nurses can help in detecting patients with depressive disorders	115 (99.1)	1 (0.9)
Functioning and prognosis		
The chance of patients with depressive disorders to be treated with modern medicine	113 (97.4)	3 (2.6)
The ability of patients with depressive disorders to take care of him/herself after treatment	105 (90.5)	11 (9.5)
The chance of patients with depressive disorders to resume work after treatment	106 (91.4)	10 (8.6)
Marital prospects of patients with depressive disorders after treatment	99 (85.3)	17 (14.7)

\*significant at  $p < 0.05$

relation to the sociodemographic variables studied (Table 5). However, majority of the respondents who agreed that special training was needed in order to deal with depressed patients were female ( $p = 0.032$ ). Also, majority of those who agreed that nurses can help in detecting patients with depressive disorders had no family history of psychiatric disorder ( $p = 0.036$ ).

Nurses with no work experience in a psychiatric institution had significantly higher overall scores on their attitudes towards functioning and prognosis of depressed patients than those with prior work experience in a psychiatric institution ( $p = 0.020$ ) as shown in Table 6. However, majority of those who agreed that depressed patients have good chances of

**Table 5.** Attitude scores of nurses in relation to sociodemographic variables.

Sociodemographic Variable	Mean Score $\pm$ SD	Test Statistic	Sig
Age (yr)		F = 0.235	0.791
20-30	10.19 $\pm$ 1.526		
31-40	10.30 $\pm$ 1.658		
>40	9.92 $\pm$ 1.443		
Sex		t = 0.993	0.323
Male	10.52 $\pm$ 1.626		
Female	10.17 $\pm$ 1.562		
Experience in nursing service (yr)		F = 2.056	0.135
<1	10.83 $\pm$ 1.467		
1-5	10.25 $\pm$ 1.296		
>5	9.82 $\pm$ 1.286		
Previous work experience in a psychiatric institution		t = 0.716	0.476
Yes	10.63 $\pm$ 1.506		
No	10.21 $\pm$ 1.566		
With family history of psychiatric disorder		t = 1.006	0.317
Yes	9.89 $\pm$ 1.711		
No	10.31 $\pm$ 1.565		

**Table 6.** Attitude scores of nurses regarding functioning and prognosis in relation to sociodemographic variables.

Sociodemographic Variable	Mean Score $\pm$ SD	Test Statistic	Sig
Age (yr)		F = 3.273	0.057
20-30	12.31 $\pm$ 1.430		
31-40	13.40 $\pm$ 1.875		
>40	13.08 $\pm$ 2.065		
Sex		t = 0.047	0.963
Male	12.59 $\pm$ 1.600		
Female	12.61 $\pm$ 1.676		
Experience in nursing service (yr)		F = 2.418	0.096
<1	12.42 $\pm$ 1.929		
1-5	12.73 $\pm$ 1.484		
>5	13.59 $\pm$ 1.622		
Previous work experience in a psychiatric institution		t = 2.368	0.020*
Yes	11.25 $\pm$ 1.581		
No	12.65 $\pm$ 1.620		
With family history of psychiatric disorder		t = 1.176	0.242
Yes	12.22 $\pm$ 1.927		
No	12.74 $\pm$ 1.639		

\*significant at  $p < 0.05$

employment and marital prospects after treatment had 1 to 5 years of experience in the nursing service ( $p = 0.003$  and  $p = 0.038$ , respectively). Also, majority of the nurses who agreed that depressed patients may be able to resume work and take care of themselves after treatment had no previous work experience in a psychiatric institution ( $p = 0.005$  and  $p = 0.003$ , respectively). No significant differences in relation to the other sociodemographic factors were noted.

*Practices Towards Patients with Depressive Disorders*

The mean score for the practices of the nurses towards patients with depressive disorders indicated overall good practice towards these patients (Table

2). Among the respondents, only 42.2% said they had encountered a patient similar to the one depicted in the case vignette. Among those who had encountered a depressed patient, majority always or often referred the patient to a psychiatrist and inform the attending physician about it. Majority of them would talk to these patients more frequently compared to their other patients (Table 7). The practice scores of nurses only differed significantly in relation to sex, as male nurses had significantly higher overall practice scores than females ( $p = 0.041$ ) as seen in Table 8. However, majority of the nurses who refer the depressed patients they encounter at work were 31 to 40 years old ( $p = 0.005$ ), and with more than five years of service ( $p = 0.024$ ). Most of the respondents never or seldom wait for depressed patients to tell their doctor about

**Table 7.** Practices of the staff nurses when they encounter depressed patients (n=49).

Practices	Always or Often No. (%)	Never or Seldom No. (%)
Refers the patient to a psychiatrist	31 (63.3)	18 (36.7)
Informs the attending physician of the individual about it	41 (83.7)	8 (16.3)
Tells a co-worker about the case of the patient	22 (44.9)	27 (55.1)
Does nothing and just do his/her usual work	6 (12.2)	43 (87.8)
Talks to them more frequently as compared to other patients	38 (77.6)	11 (22.4)
Talks to them less frequently as compared to other patients	10 (20.4)	39 (79.6)
Waits for the patient to tell his/her doctor about her problem	14 (28.6)	35 (71.4)

**Table 8.** Practice scores of nurses towards depressed patients in relation to sociodemographic variables.

Sociodemographic Variable	Mean Score ± SD	Test Statistic	Sig (p-value)
Age (yr)		F = 2.609	0.086
20-30	20.71 ± 2.710		
31-40	21.92 ± 2.499		
>40	23.17 ± 1.722		
Sex		t = 2.111	0.041*
Male	22.06 ± 2.645		
Female	20.33 ± 2.526		
Experience in nursing service (yr)		F = 0.505	0.609
<1	21.50 ± 1.915		
1-5	22.18 ± 3.060		
>5	21.00 ± 2.796		
Previous work experience in a psychiatric institution		t = 0.949	0.347
Yes	22.75 ± 1.893		
No	21.42 ± 2.726		
With family history of psychiatric disorder		t = 0.092	0.927
Yes	21.77 ± 2.315		
No	21.69 ± 2.714		

\*significant at  $p < 0.05$

their problems, and majority of these nurses were female ( $p = 0.027$ ).

## Discussion

The study revealed that the nursing staff of the institution has inadequate knowledge of depressive disorders. This is congruent with other studies and may be due to the heterogeneity of depressive disorders, which can make it difficult for the nurses to recognize the signs and symptoms of depression.<sup>19-23</sup>

The nurses' knowledge of depressive disorders did not differ significantly in relation to the respondents' age, sex, years of experience, or previous work experience in a psychiatric institution. This is in contrast with a study by Ndeti which noted a slight decrease in knowledge and awareness of psychiatric disorders with increase in age.<sup>17</sup> Interestingly, those with no family history of psychiatric disorders had significantly higher knowledge scores that may imply that having a family history of psychiatric disorders did not necessarily improve the knowledge of the nurses regarding depressive disorders.

Majority of the nurses showed overall positive attitude towards evaluation, management, functioning and prognosis of patients with depressive disorders. This is in contrast with a study by Scheerder wherein nurses were found to have a more negative attitude towards patients with depression and their treatment.<sup>24</sup> However, the findings were similar to that of Deribew and Tesfaye which indicate that nurses may still be optimistic on the effects of treatment of mental health problems including depressive disorders.<sup>14</sup> However, majority of the nurses believed that depressed patients are dangerous and unpredictable and that special training is needed to give care to these patients; this is congruent with other studies which indicate that nurses may perceive themselves to have inadequate skills to deal with patients with depressive disorders.<sup>14,17,24,25</sup> These findings may be due to inadequate training in school and the lack of refresher courses on mental health disorders.<sup>14</sup>

The general attitude scores of the nurses towards evaluation and management of depressive disorders did not differ significantly with the sociodemographic variables. However, female nurses perceived themselves incapable of dealing with depressed patients as they expressed the need for special training to give care for patients with depressive disorders. In addition, nurses with no history of work experience had a

more positive attitude regarding functioning and prognosis of depressed patients and this might be due to their idealism and optimism. Nurses with 1-5 years of experience have optimistic views towards employment and marital opportunities of the patients, and this is in contrast to the results of a previous study which showed that those with less than 5 years of experience had negative attitude towards mental health problems.<sup>14</sup> These findings may indicate that those with less than one year of experience may not have had enough exposure to patients with depressive disorders and that those with more than five years of experience in the nursing service may need continuing education and training to lessen stigmatizing attitudes and maintain optimism towards depressive disorders. Majority of those with no previous work experience in a psychiatric institution had positive attitude towards ability of depressed patients to take care of themselves and their chances to go back to work, and this might also be due to their optimistic and idealistic views toward prognosis of depressive disorders.

Less than half of the respondents encountered a similar patient in the case vignette presented in the questionnaire, and this may imply possible difficulties in recognizing the symptoms in the vignette compared to the usual patients they see at work that can either be due to the inadequate knowledge of the staff nurses on the symptoms of depressive disorders or due to the heterogeneity of the symptomatology of depressive disorders.<sup>23</sup>

Overall, the nursing staff had generally good practices towards patients with depressive disorders. Majority would often refer to either a psychiatrist or the attending physician. In particular, those in the 31-40 years age range and with more than 5 years of experience tend to refer to a psychiatrist more, which may indicate awareness of hospital protocols in dealing with such patients. However, the age of the nurses was not correlated to their years of experience to determine whether the discrepancy in practices in terms of age range was really just due to age or because of their experience. Male nurses generally had overall better practices towards patients with depressive disorders, but female nurses more likely do not wait for depressed patients to tell the doctor about their problem, which may be due to their perceived inadequacy in dealing with them.

Limitations of the study include the lack of specific exclusion criteria for psychiatric nursing personnel; and specific areas of work and job specifications of

the nurses were not considered in the interpretation of results as well. Further validation and testing of reliability of the questionnaire with a larger sample size should also be considered. A study with a larger sample size may also be helpful in further investigating the differences of the knowledge, attitude and practices of the nurses in relation to the sociodemographic variables studied. Despite the limitations noted, the study may provide relevant data on the trends of knowledge, attitude and practices of nurses towards depressive disorders; hence, the findings in the study can be used for further studies.

The knowledge of the nursing staff of UERMMMCI regarding depressive disorders was generally inadequate. Although the nursing staff showed an overall positive attitude regarding the evaluation, management, functioning and prognosis of depressive disorders, majority of them still believed that depressed patients are dangerous and unpredictable and that special training is needed to deal with patients with depression. The nursing staff had generally good practices towards patients with depressive disorders but male nurses tended to have better practices which may indicate more confidence when dealing with such patients. The findings indicate a need for continuing education and refresher courses for nurses on depressive disorders.

This study was able to determine the knowledge, attitude and practices of the nursing staff of UERMMMCI towards depressive disorders and their associations with some sociodemographic factors. It is hoped that the results of the study may contribute to local data to help in policy formulation for providing better service delivery for patients with depressive disorders.

## References

- Whiteford HA, Degenhardt L, Rehm J. Global burden of disease attributable to mental and substance use disorders: Findings from the Global Burden of Disease Study 2010. *Lancet* [Internet]. 2013; 382(9904): 1575-86. doi: 10.1016/S0140-6736(13)61611-6
- World Health Organization. World Health Report. Mental health: New understanding, new hope [Internet]. 2001. Geneva, Switzerland WHO. Retrieved from <https://www.who.int/whr/2001/en/>.
- De Leo D, Milner A, Xiangdong W. Suicidal behavior in the Western Pacific region: characteristics and trends. *Suicide Life Threat Behav* [Internet]. 2009; 39: 72-81. doi: 10.1521/suli.2009.39.1.72
- Almanzar SA, Shah M, Vithalani S, Shah S, Squires J, Appasani R, Katz CL. Knowledge of and attitudes toward clinical depression among health providers in Gujarat, India. *Ann Glob Health* [Internet]. 2014; 80(2): 89-95. doi: 10.1016/j.aogh.2014.04.001
- Kerr M, Blizard R., Mann A. General practitioners and psychiatrists: Comparison of attitudes to depression using the depression attitude questionnaire. *Br J Gen Pract* [Internet]. 1995; 45: 89-92. Retrieved from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1239142/>.
- Pande V, Saini R, Chaudhury S. Attitude toward mental illness amongst urban non-psychiatric health professionals. *Ind Psychiatr J* [Internet]. 2011; 20(1): 17-20. doi: 10.4103/0972-6748.98409
- Kabir M, Iliyasu Z, Abubakar IS, Aliyu MH. Perception and beliefs about mental illness among adults in Karfi village, Northern Nigeria. *BMC Int Health Hum Rights* [Internet]. 2004; 4: 3. doi: 10.1186/1472-698X-4-3
- Aydin N, Yigit A, Inandi T, Kirpinar I. Attitudes of hospital staff toward mentally ill patients in a teaching hospital, Turkey. *Int J Soc Psychiatr* [Internet]. 2003; 49(1): 17-26. doi: 10.1177/0020764003049001544
- Gureje O, Lasebikan V, Oluwanuga OE, Olley BO, Kola L. Community study of knowledge and attitude to mental illness in Nigeria. *Br J Psychiatr* [Internet]. 2005; 186: 436-41. doi: 10.1192/bjp.186.5.436
- Wolff G, Pathare S, Craig T, Leff J. Community knowledge of mental illness and reaction to mentally ill people. *Br J Psychiatr* [Internet]. 1996; 168(2): 191-8. doi: 10.1192/bjp.168.2.191
- Bruhl KG, Luijendijk HJ, Muller MT. Nurses' and nursing assistants' recognition of depression in elderly who depend on long-term care. *J Am Med Dir Assoc* [Internet]. 2007; 8(7): 441-5. doi: <http://dx.doi.org/10.1016/j.jamda.2007.05.010>
- McDonald MV, Passik SD, Dugan W, Rosenfeld B, Theobald DE, Edgerton S. Nurses' recognition of depression in their patients with cancer. *Oncol Nurs Forum* [Internet]. 1999; 26(3): 593-9.
- Gurung G. Knowledge and attitude of nurses regarding mental illness. *J Chitwan Med Coll* [Internet]. 2014; 4(8): 40-3. doi: <http://dx.doi.org/10.3126/jcmc.v4i2.10863>
- Deribew A, Tesfaye M. Assessment of knowledge, attitude and practice of nursing staff towards mental health problems in Jimma Zone, South Western Ethiopia. *Ethiop J Health Sci* [Internet]. 2005; 15(2): 199-206. Available from: [https://www.researchgate.net/publication/255708959\\_ASSESSMENT\\_OF\\_KNOWLEDGE\\_ATTITUDE\\_AND\\_PRACTICE\\_OF\\_NURSING\\_STAFF\\_TOWARDS\\_MENTAL\\_HEALTH\\_PROBLEMS\\_IN\\_JIMMA\\_ZONE\\_SOUTH\\_WESTERN\\_ETHIOPIA](https://www.researchgate.net/publication/255708959_ASSESSMENT_OF_KNOWLEDGE_ATTITUDE_AND_PRACTICE_OF_NURSING_STAFF_TOWARDS_MENTAL_HEALTH_PROBLEMS_IN_JIMMA_ZONE_SOUTH_WESTERN_ETHIOPIA).
- Shyangwa PM, Singh S, Khandelwal SK. Knowledge and attitude about mental illness among nursing staff. *J Nepal Med Assoc* 2003; 42: 27-31.
- Brinn F. Patients with mental illness: General nurses attitude and expectation. *Nurs Stand* [Internet]. 2000; 14(27): 32-6. doi:10.7748/ns2000.03.14.27.32.c2792

17. Ndetei DM, Khasakhala I, Mutiso V, Mbwayo AW. Knowledge, attitude and practice (KAP) of mental illness among staff in general medical facilities in Kenya: practice and policy implications. *African J Psychiatr* [Internet]. 2011; 14(3): 225-35. doi: <http://dx.doi.org/10.4314/ajpsy.v14i3.6>
18. Videbeck SL. *Psychiatric-Mental Health Nursing*. 5th ed. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins, 2011.
19. Muga T, Mbuthia G, Gatimu SM, Rossiter R. A pilot study exploring nursing knowledge of depression and suicidal ideation in Kenya. *Issues Mental Health Nurs* [Internet]. 2018; 37(7): 1-6. doi: [10.1080/01612840.2018.1489922](https://doi.org/10.1080/01612840.2018.1489922)
20. Kumar P, Shoba B. A study to assess the knowledge and attitude of nurses regarding management of patient with depression in a selected general hospital at Tumkur, Karnataka. *IOSR J Nurs Health Sci* [Internet]. 2014; 3(2) Ver IV: 63-7. doi: [10.9790/1959-03246367](https://doi.org/10.9790/1959-03246367)
21. Furegato AF, Ferreira da Silva Candido MC, Lobo da Costa Jr M. Comparing knowledge and opinions on depression among nurses in the health services. *Rev Salud Publica (Bogota)* [Internet]. 2009; 11(2): 200-11. doi: [10.1590/S0124-00642009000200005](https://doi.org/10.1590/S0124-00642009000200005)
22. Park SC, Lee HY, Lee DW. Knowledge and attitude of 851 nursing personnel toward depression in general hospitals of Korea. *J Korean Med Sci* [Internet]. 2015; 30: 953-9. doi: [10.3346/jkms.2015.30.7.953](https://doi.org/10.3346/jkms.2015.30.7.953)
23. Ostergaard SD, Jensen SO, Bech P. The heterogeneity of the depressive syndrome: When numbers get serious. *Acta Psychiatr Scand* 2011; 124: 495-6.
24. Scheerder G, Van Audenhove C, Arensman E. Community and health professionals' attitude toward depression: A pilot study in nine EAAD countries. *Int J Soc Psychiatr* [Internet]. 2010; 57(4): 387-401. doi: [10.1177/0020764009359742](https://doi.org/10.1177/0020764009359742)
25. Mbatia J, Shah A, Jenkins R. Knowledge, attitudes and practice pertaining to depression among primary health care workers in Tanzania. *Int J Ment Health Syst* [Internet]. 2014; 3: 5. doi: [10.1186/1752-4458-3-5](https://doi.org/10.1186/1752-4458-3-5)

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# The comparison between management recommendations of the Neonatal Early Onset Sepsis Calculator and CDC/AAP Guidelines among culture-proven early onset sepsis admitted at University of East Ramon Magsaysay Memorial Medical Center from January 2013 to December 2017

Angelia Septiane Beandda, MD; Katherine Mae A. Doctor, MD and Jacqueline Doctor Bernabe, MD, MMHoA

## Abstract

**Introduction** Early onset sepsis is difficult to diagnose due to nonspecific symptoms and a lack of reliable tests. It can progress quickly, and lead to neurodevelopmental consequences or be fatal if not treated. However, approximately 10-fold more newborns are treated with antibiotics empirically and often unnecessarily. This study aimed to compare the management recommendations of the Neonatal Early Onset Sepsis Calculator with those of the Centers for Disease Control/American Academy of Pediatrics guidelines.

**Methods** Neonatal Early Onset Sepsis Calculator was applied to the data set to examine how an alternative model would perform compared to current guidelines published by the CDC and compared to current practice within the institution. Chi square and kappa value agreement was used to determine the difference between treatment recommendations of NEOS calculator and AAP guideline.

**Results** Of the 330 patients who received therapy, only 14.2% were recommended empiric antibiotics by the EOS calculator, compared to the 39% recommended by the CDC guidelines ( $p < 0.001$ ,  $K = 0.372$ ). Eleven patients were identified to have culture-positive sepsis.

**Conclusion** The number of infants suspected with EOS and subsequently require antibiotic use at birth may be dramatically reduced with the use of the neonatal EOS calculator.

**Keywords:** early onset sepsis, Early Onset Sepsis Calculator, CDC/AAP guidelines, neonates, antibiotic overuse, blood culture

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## Correspondence:

Jacqueline Doctor Bernabe, MD, MMHoA, Department of Pediatrics, University of the East Ramon Magsaysay Memorial Medical Center Inc., 64 Aurora Boulevard, Barangay Doña Imelda, Quezon City, PH 1113; e-mail: jacqmd1010@gmail.com

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Department of Pediatrics, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

The most frequent cause of mortality in neonates is infection; this includes sepsis, meningitis, pneumonia, diarrhea and tetanus.<sup>1</sup> In 2015, among the 5.941 million deaths in children under 5 years, 45% died during the neonatal period.<sup>2</sup> Neonates are a vulnerable population due to their immature immune system. Other factors such as prematurity, low birth weight, respiratory problems, maternal infection and delivery room manipulations further place neonates at risk for developing sepsis. The reported incidence of neonatal sepsis varies from 7.11 to 38.17 per 1000 live births in Asia, from 6.52 to 23.15 per 1000 live births in Africa, and from 3.59 to 8.91 per 1000 live births in South America and the Caribbean. By comparison, rates reported in the United States and Australasia range from 1.5 to 3.5 per 1000 for early onset sepsis (EOS) and up to 6 per 1000 live births for late onset sepsis (LOS), a total of 6 to 9 per 1000 for neonatal sepsis.<sup>1</sup> According to 2012 Philippine Health Statistics, bacterial sepsis of the newborn is one of the leading causes of infant mortality, with the incidence being 3.16 per 1000 live births.<sup>3</sup>

The clinical signs of sepsis in neonates are often nonspecific. Detection of EOS requires clinicians to maintain a high index of suspicion. Familiarity with epidemiologic risk factors is crucial to determine the threshold index of suspicion. For early onset infection, any perinatal risk factor that may be present should be considered, including maternal Group B *Streptococcus* (GBS) disease status, chorioamnionitis, prolonged rupture of membranes, and gestational age. For late onset infection, considerations include whether the patient has indwelling foreign bodies such as a central venous catheter or endotracheal tube, is dependent on parenteral nutrition, or receives proton pump inhibitor or histamine-2 blocking therapy. Clinical signs and symptoms are variable and unfortunately, non-specific and can reflect non-infectious etiologies. Common presenting signs include respiratory distress, hemodynamic instability with poor perfusion or shock and temperature instability. Lethargy or poor feeding may be the only symptom initially. Metabolic changes may include hyperglycemia or hypoglycemia, acidosis and jaundice. Since signs and symptoms are nonspecific, the clinical diagnosis of neonatal sepsis is extremely challenging.<sup>4</sup>

More reliable and consistently applied diagnostic criteria would help improve our knowledge of the disease epidemiology. Several therapeutic attempts to control systemic inflammation in sepsis were

unsuccessful. The initial signs and symptoms of EOS can be difficult to distinguish from normal newborn variation. The estimate of a newborn's risk of sepsis at birth is crucial for determining appropriate monitoring, laboratory testing and/or treatment. Several prenatal and perinatal conditions are known to substantially increase the chance that a newborn will develop EOS, including preterm birth, prolonged rupture of amniotic membranes, maternal GBS infection, and intrapartum antibiotic prophylaxis (IAP), maternal fever, chorioamnionitis, and a history of a sibling with EOS.<sup>5</sup> In particular, the clinical diagnosis of chorioamnionitis may increase the risk of EOS two- to sixfold.<sup>6</sup>

Early identification of a newborn with EOS based on clinical and laboratory findings is difficult.<sup>7</sup> Several laboratory findings, including a low absolute neutrophil count, a high ratio of immature to total neutrophil count, a high ratio of immature to total neutrophil count divided by total neutrophil count, and an elevated C-reactive protein (CRP) level, are statistically associated with an increased risk of EOS. Unfortunately, many, if not most, newborns with EOS have normal laboratory screening test results. Furthermore, negative predictive values of these tests are very high, but since prevalence of EOS in term newborns, even those with risk factors for sepsis, is low, a normal laboratory test finding, in isolation, is of limited help in aiding clinical decision making.

Guideline recommendations to initiate treatment with intravenous antibiotics on all term newborns born to women with chorioamnionitis remain controversial. Due to potentially fatal consequences of neonatal sepsis, antibiotics are administered empirically in many neonates. This means that antibiotics are administered before the clinician knows the causative pathogen or whether the neonate has an infection at all. This eventually leads to a significant overuse of antibiotics in the neonatal population. Antibiotic use is not benign and has consequences on an individual and population level.<sup>8,9</sup> Antibiotic use contributes to the development of antibiotic resistant pathogens and superinfections. There is also research demonstrating links between antibiotic exposure and changes to the gut microbiome influencing obesity, asthma, and allergy.<sup>10</sup> The Neonatal Intensive Care Unit (NICU) has been identified as a site for development and transmission of antibiotic resistant bacteria because of the frequency of empiric antibiotic

therapy.<sup>11</sup> Additionally, neonates are particularly susceptible to the consequences of resistant infections. Laxminarayan estimates 214,500 global neonatal deaths annually attributable to resistant pathogens.<sup>12</sup>

To minimize the potentially adverse effects of antibiotic treatment, several guidelines have been established to guide the prescription of systemic antibiotics in neonates.<sup>13,14</sup> Investigators from Boston and Northern California have adopted a different approach for estimating the risk of EOS at birth in newborns at 34 weeks gestation or later. Using data from more than 600,000 deliveries, they developed a model for assigning a numeric risk of EOS in a newborn based on the following criteria: gestational age, maximal maternal temperature during labor, hours of rupture of membranes, GBS screening results in the mother and use and timing of IAP.<sup>15</sup> The risk of sepsis is further refined on the basis of clinical appearance of the newborn (well-appearing, equivocal presentation, or evidence of clinical illness). Specific criteria for these classifications are provided. The clinician can then consider the risk, estimate and determine the appropriate management for the baby. The recommendation from the originators is to start empiric antibiotic therapy if the estimated risk of EOS is 1.54 or more cases per 1000 live births.

Shakib compared current AAP and CDC guidelines to Neonatal Early Onset Sepsis (NEOS) Calculator. Application of the NEOS calculator was estimated to reduce empiric antibiotic use by 65% of the study population.<sup>16</sup> Adoption of the NEOS Calculator and a more precise risk stratification model to treat suspected EOS has the potential to decrease unnecessary antibiotic exposure, reduce health care costs, minimize antibiotic resistance, and lead to better health outcomes for neonates.<sup>17</sup>

EOS of the newborn remains a challenging clinical dilemma due to its relative rarity, high mortality and lack of highly specific biomarkers. Incorporating the Kaiser Permanente NEOS Calculator as a clinical tool may dramatically reduce the number of neonates who require antibiotic therapy leading to improved antimicrobial stewardship, reduce the need for IV access, laboratory monitoring and risk of adverse drug events.

This study examines an EOS management tool which may benefit the community and future practice in determining if reduction of empiric antibiotic use can be done while maintaining patient safety and achieving improved patient outcomes. The study

results will inform future practitioners regarding the treatment of EOS which could result in reduced use of empiric antibiotics in neonates suspected of having EOS. Furthermore, the findings of this study provide baseline data to antibiotic administration using treatment guidelines that were in place from January 2013 to December 2017 at the UERMMMCI hospital.

This study aimed to: 1) describe management recommendations using the Neonatal Early Onset Sepsis Calculator versus the CDC/AAP guidelines among culture-proven positive neonates  $\geq 34$  weeks AOG treated for early onset sepsis and 2) determine the agreement management between CDC/AAP guidelines and Neonatal Early Onset Sepsis Calculator with regard to infants treated for early onset sepsis.

## Methods

A retrospective chart review of 5 years' data between January 2013 to December 2017 was conducted at UERMMMCI for infants  $\geq 34$  weeks gestational age treated for early onset sepsis. The NEOS calculator was applied to the data set to examine how an alternative model would perform compared to current guidelines published by the CDC and compared to current practice within the institution.

The charts of all infants  $\geq 34$  weeks gestational age who have received empiric antibiotics for early onset sepsis within 72 hours of life between January 2013 to December 2017 at UERMMMCI Hospital were retrieved. Infants who received antibiotic therapy with an indication other than rule out EOS, with chromosomal abnormalities, or with major congenital anomalies were excluded. Using an estimated prevalence of 17%, 95% confidence intervals, and absolute precision of 10%, a sample size of 93 was determined. The prevalence rate was estimated based on study prevalence of early-onset neonatal infection among newborns of mothers with bacterial infection or colonization: a systematic review and meta-analysis.<sup>18</sup>

Detailed information from mothers' medical records was collected, including gestational age, intrapartum maximum temperature in Celsius (if the intrapartum temperature was not recorded, the temperature at the time of admission was used), duration of ruptured membranes, GBS status (filled as unknown due to unavailability of data at the

participating facility), and the presence of antepartum antibiotic administration. Antibiotic administration for the mother was categorized according to Puopolo and Escobar's NEOS calculator.<sup>15</sup> The investigators used the five variables to retrospectively calculate an EOS risk score at birth. Neonatal information included gestational age, birth weight, APGAR score on the 1st and 5th minute, CBC, blood culture results, antibiotic use and duration, and survival to discharge was obtained from the electronic records. Clinical presentation was determined using progress notes and documented vital signs in the first 12 hours of life and patient was classified as having clinical illness, equivocal appearance, or well appearing status as described by risk the calculator author (available at <https://neonatalesepsiscalculator.kaiserpermanente.org/classification.aspx>).

Clinical illness was defined as a five minute Apgar score of less than five, neonatal encephalopathy, use of vasoactive drugs, clinical seizure, continuous positive airway pressure, high flow nasal cannula, mechanical ventilation outside of the delivery room, or need for supplemental oxygen to maintain saturation greater than 90% for more than two hours. Equivocal presentation was defined as a single vital sign category documented as abnormal greater than four hours apart, or two vital sign categories each documented as abnormal two hours apart in the first 12 hours of life. Well appearing was defined as not meeting the criteria for clinical illness or equivocal presentation in the first 12 hours of life. In cases that were not clearly in one clinical category, the neonate was classified into the more severe illness category.

The data were entered into the online NEOS calculator using the CDC national incidence of EOS of 0.5/1000 live births. Each neonate's risk of EOS per thousand live births and the treatment recommendations based on clinical presentation was recorded. Neonates were categorized as requiring empiric antibiotic therapy according to the CDC guidelines if they showed clinical illness or were born to mothers with suspected/diagnosed chorioamnionitis. Following data collection, calculator recommendations for empiric antibiotics, blood cultures and vital sign monitoring according to clinical status was recorded for each subject.

Data were analyzed using Stata version 13 software. Mean with standard deviation were used to summarize continuous variables while categorical data were expressed using counts and proportions.

To determine change or difference between treatment recommendations of NEOS calculator and AAP guideline with blood CS, McNemar test was used. Management recommendations of culture-proven sepsis were compared between NEOS calculator and CDC/AAP guidelines using Chi square test. Agreement between NEOS calculator and CDC/AAP was determined using Kappa value of agreement. A p-value < 0.05 was used as cut-off for significance. Measures of accuracy were likewise computed using NEOS calculator and AAP guideline as the screening test and blood culture result as the reference standard.

Ethics approval was obtained prior to implementation of study procedures. All information from the electronic medical record that was reviewed would not reveal the identification of the patients. The patients were tagged anonymously by assigning control numbers. There were no potential risks and no anticipated benefits to the individual participants. There was no communication between the investigators and the subjects in connection with the research. The waiver of informed consent did not adversely affect the rights and welfare of the subjects.

## Results

Records review of 330 neonates revealed the following maternal profile: The mean age was 28.7 years with majority being primigravid and primiparous. PROM occurred in a third of the mothers, majority of which lasted  $\geq 18$  hours. The predominant mode of delivery was cesarean section, mostly on an emergency basis (Table 1). Among neonates, majority were males at 37-42 weeks age of gestation, weighing on the average 2844.8 grams, appropriate for gestational age (AGA), and having a mean Apgar score of 8 and 9 at 1 and 5 minutes, respectively. Their mean age was 2.1 days. Majority (73.1%) were clinically well appearing as shown in Table 2.

Among those in whom a blood culture was obtained, more than 95% were negative. Among those with positive results, the organisms grown were *Acinetobacter lwoffii* (3), *Staphylococcus epidermidis* (3), *Klebsiella* (2), *Pseudomonas* (2), *E. coli* (1) and *Enterococcus* (1). CBC results yielded a mean hemoglobin concentration of 162.7 g/dl, mean WBC count of 18.3 and mean platelet count of  $276.5 \times 10^3$  as shown in Table 3. Empiric antibiotics consisted primarily of an ampicillin-aminoglycoside combination given on the average for 6 days. In cases

where antibiotics were shifted, duration was reduced to 5.3 days. The antibiotics were usually shifted to

**Table 1.** Maternal profile and intrapartum conditions.

Maternal Characteristics	n (%)
Mean maternal age + SD (yr)	28.7 ± 5.9
Gravidity	
Primigravid	194 (58.8)
Multigravid (≥ G2)	136 (41.2)
Parity	
Primipara	207 (62.7)
Multipara (≥ P2)	123 (37.3)
PROM	
PROM < 18h	28 (25.7)
PROM ≥ 18h	71 (65.1)
PPROM	10 (9.2)
Mode of delivery	
NSD	143 (43.3)
Vacuum extraction	13 (3.9)
Cesarean section	174 (52.7)
Elective	4
Emergency	170

**Table 2.** Neonatal profile and clinical presentation.

Neonatal Characteristic	n (%)
Sex	
Male	196 (59.4)
Female	134 (40.6)
Gestational age in weeks	
34-36	32 (9.7)
37-42	298 (90.3)
Mean age in days ± SD	2.1 ± 2.2
Mean birthweight in grams ± SD	2844.8 ± 619.2
Weight for age classification	
SGA	36 (10.9)
AGA	270 (81.8)
LGA	24 (7.3)
Apgar score	
Mean score at 1 minute ± SD	8.4 ± 1.1
Mean score at 5 minutes ± SD	8.8 ± 0.6
Clinical Presentation	
Clinical illness	37 (11.2)
Equivocal	52 (15.7)
Well appearing	241 (73.1)

meropenem, or piperacillin + tazobactam as shown in Table 4.

Among 47 neonates recommended to be started on antibiotics using the NEOS calculator, only 14% had positive blood culture results and among 283 neonates requiring only watchful waiting, 98.1% had negative blood culture results. This change or difference was significant at  $p < 0.001$  as shown in Table 5. Among 128 neonates recommended to be started on antibiotics using the AAP guideline, only 5.1% had positive blood culture results and among 202 neonates requiring only watchful waiting, 97.5% had negative blood culture results. This change or difference was significant at  $p < 0.001$  (Table 5).

**Table 3.** Laboratory findings in neonates suspected of EOS.

Laboratory Parameters	No. (%)
Blood culture and sensitivity	
Positive	11 (3.5)
<i>Acinetobacter lwoffii</i>	3
<i>E. coli</i>	1
<i>Enterococcus</i>	1
<i>Klebsiella pneumoniae</i>	2
<i>Pseudomonas</i>	2
<i>Staphylococcus epidermidis</i>	3
Negative	303 (96.5)
Complete blood count	
Mean Hgb ± SD (g/dl)	162.7 ± 25.3
Mean WBC ± SD	18.3 ± 7.2
Mean platelet count ± SD ( $\times 10^3$ )	276.5 ± 78.2

**Table 4.** Antibiotic use and duration of treatment.

Empiric Antibiotics	No. (%)
Ampicillin-amikacin	325 (98.5)
Meropenem-amikacin	1 (0.3)
Oxacillin-amikacin	2 (0.6)
Piperacillin + tazobactam	2 (0.6)
Mean duration in days of empiric antibiotics ± SD	6.0 ± 2.3
Shift of antibiotics	
Ampicillin to meropenem	5
Ampicillin to ceftazidime	1
Ampicillin to cefotaxime	1
Ampicillin to piperacillin + tazobactam	5
Oxacillin to ampicillin	1
Mean duration in days prior to shift of antibiotics ± SD	5.3 ± 2.6

The NEOS Calculator identified 6 out of 11 blood culture-positive neonates to be started on antibiotics and 87.8% of blood culture-negative neonates to be observed. It missed to identify as requiring watchful waiting only 12.3% of those negative on blood culture and missed to identify as requiring antibiotics 45.5% of those positive on blood culture, as shown in Tables 5 and 6. Among those recommended to be started on antibiotics, 14% were positive on blood culture and among those recommended to be observed, 98.2% were negative on blood culture. The overall accuracy of using NEOS calculator is 86.6%. There is a small increase in the likelihood of a positive blood culture given that it is recommended to start antibiotics and a minimal decrease in the likelihood of a positive blood culture given that only watchful waiting is recommended (Table 6).

The AAP guideline identified 6 out of 11 of blood culture-positive neonates to be started on antibiotics and 72.2% of blood culture-negative neonates to be observed. It missed to identify as requiring watchful

waiting only 37.0% of those negative on blood culture and missed to identify as requiring antibiotics 45.5% of those positive on blood culture, as shown in Tables 5 and 6. Among those recommended to be started on antibiotics, 5.1% were positive on blood culture and among those recommended to be observed, 98.3% were negative on blood culture. The overall accuracy of using AAP guideline is 71.7%. There is a minimal increase in the likelihood of a positive blood culture given that it is recommended to start antibiotics and a minimal decrease in the likelihood of a positive blood culture given that only watchful waiting is recommended (Table 6).

Using NEOS calculator, starting antibiotics is recommended in 14.2% and watchful waiting in 85.8%. Using AAP guideline, starting antibiotics is recommended in 39% and watchful waiting in 61%. There is a significant difference in the treatment recommendations between NEOS calculator and AAP guidelines ( $p < 0.001$ ), as shown in Table 7). In terms of agreement between the two methods, among

**Table 5.** Comparison of management recommendations using NEOS Calculator and AAP guidelines in culture-proven sepsis

Management Recommendation	Blood CS		Total	p-value*
	Positive	Negative		
<b>NEOS Calculator</b>				
Start antibiotics	6 (14.0)	41 (86.0)	47	< 0.001
Watchful waiting	5 (1.9)	278 (98.1)	283	
<b>AAP guidelines</b>				
Start antibiotics	6 (5.1)	122 (94.9)	128	< 0.001
Watchful waiting	5 (2.6)	197 (97.5)	202	

\*McNemar change test

**Table 6.** Summary table of measures of accuracy using NEOS Calculator and AAP guideline in culture-proven sepsis.

Measures of Accuracy	NEOS Calculator	AAP Guideline
Sensitivity	54.6%	54.6%
Specificity	87.8%	72.2%
False positive	12.3%	37.0%
False negative	45.5%	45.5%
Positive predictive value	14.0%	5.1%
Negative predictive value	98.2%	98.3%
Diagnostic accuracy	86.6%	71.7%
Likelihood ratio of a positive test	4.45	1.96
Likelihood ratio of a negative test	0.52	0.63

those recommended to be started on antibiotics by NEOS calculator, 93.6% were also recommended to be started on antibiotics by AAP guideline. Among those recommended watchful waiting by NEOS calculator, 70.3% were likewise recommended the same by AAP guideline. However, such agreement though significant ( $p < 0.001$ ) is slight ( $K = 0.372$ ) between NEOS calculator and AAP guideline in terms of treatment recommendation (Table 8).

### Discussion

Early onset neonatal sepsis is a systemic infection occurring in infants at  $\leq 72$  hours of life and is an important cause of morbidity and mortality of newborns.<sup>19</sup> Neonatal sepsis remains a major health problem in developing countries, including the Philippines, and is the major cause of mortality of newborn with the mortality rate of 14.2%.<sup>3</sup> Despite the high burden of neonatal sepsis, high-quality evidence in diagnosis and treatment is lacking.<sup>20</sup> The clinical presentation of infections can be subtle, prompting clinicians to empirically start antibiotics when infection is a possibility. In a study of 5,693 extremely low birth weight neonates, 98% received antibiotic treatment in the first three days of life, while only 2% of the neonates had positive blood culture results. Each additional day, empiric treatment was associated with a 4% increase in the odds of necrotizing enterocolitis (NEC) and a 16% increase in the odds of death. Kuppala reports the prolonged

administration of empirical antibiotics was associated with increase of necrotizing enterocolitis, late onset sepsis and death.<sup>21</sup>

The EOS calculator was designed to estimate the risk of EOS in all neonates born at  $\geq 34$  weeks of gestation.<sup>22</sup> The use of the evaluation for sepsis in neonates and empiric antibiotics in neonates at risk for EOS were noted to be reduced by the EOS calculator. The calculator used maternal risk factors and clinical signs in 86 neonates, both of which can be difficult to interpret and vary widely in the population of neonates with culture-proven EOS.<sup>23</sup> The investigators found that the Kaiser Permanente Neonatal EOS Calculator recommends the use of empiric antibiotics in infants less than the management recommendation criteria of the CDC guideline. Current practice favors over-treatment helping to ensure no cases of EOS are missed due to the potential morbidity and mortality of untreated sepsis. In this study, the neonates that the NEOS Calculator recommends to treat had risk factors that warranted empiric antibiotics, but the neonate was well enough at 48 to 72 hours to discontinue treatment.

For diagnosis of neonatal sepsis, blood culture is the gold standard but the positivity rate is low. Blood culture result is affected by blood volume inoculated, prenatal antibiotic use, level of bacteremia and laboratory capabilities. The prevalence of culture-positive EOS in our population was low. In our sample of 330 newborns, there were 11 infants (3.3%) who were culture-positive. This study showed that gram

**Table 7.** Comparison of treatment recommendations between NEOS Calculator and AAP guideline.

Treatment Recommendation	NEOS calculator	AAP guideline	p-value*
Start antibiotics	47 (14.2)	128 (39.0)	< 0.001
Watchful waiting	283 (85.8)	202 (61.0)	

\*Chi square test

**Table 8.** Agreement between NEOS Calculator and AAP guideline in terms of treatment recommendations.

NEOS calculator	AAP Guideline		Total	Kappa value	p-value <sup>1</sup>
	Start antibiotics	Watchful waiting			
Start antibiotics	44 (93.6)	3 (6.4)	47	0.372	< 0.001
Watchful waiting	84 (29.7)	199 (70.3)	283		
Total	128	202	330		

<sup>1</sup>Kappa value of agreement

negative organisms were the most common pathogenic bacteria cultured. A previous study in the Philippines also reported the same findings.<sup>20</sup>

A previous research conducted by Carola found out that of 896 newborns treated with empiric antibiotics, the EOS calculator had poor sensitivity and positive likelihood ratio (LR+) when compared with CBC and CRP in evaluating the possibility of Early On-set Sepsis Calculator.<sup>24</sup> A study in Utah by Shakib on 698 newborns reported reduced antibiotic exposure using the EOS calculator, but there was only a noted case of culture positive sepsis.<sup>16</sup> Similar findings were also reported by Warren, who reported that the EOS calculator recommended empiric antibiotics for a significantly smaller proportion of infants compared with CDC guideline criteria, and recommended antibiotics for all seven cases of culture-negative presumed sepsis that received full courses of therapy; however no cases of culture-positive sepsis were observed in this study.

A more recent study from the authors of the neonatal early onset calculator reported a decrease in empirical antibiotic administration and blood culture use while using EOS risk prediction models in sepsis evaluation. The study reported any significant increase in the rate of readmissions of early onset sepsis. However, this study reported the EOS calculator failed to recommend five neonates with culture proven EOS (50% from the infants with EOS). Five neonates developed symptoms before discharge which prompted evaluation and antibiotic therapy. From this cohort, the authors noted also that the EOS calculator and CDC guidelines failed to identify almost 50% neonates with proven positive cultures.<sup>24</sup>

The present study is consistent with a recent study that showed that the EOS calculator is a simple and safe tool to help clinical decisions which can reduce the number of uninfected infants who were assessed and treated with empiric antibiotics for suspected early onset sepsis and did not result in any case of late presentation of EOS or treatment delay.<sup>25</sup> A large number of practitioners are using the neonatal EOS risk calculator for the management of neonates born to mothers with chorioamnionitis. In spite of concerns about the performance of the EOS risk calculator and the use of manpower and resources to implement it, the use of EOS risk calculator is increasing.

The limitation of this study is that it is retrospective and was only carried out in a single center. Many newborns with neonatal sepsis are not included

because the data needed to calculate the risk of EOS is incomplete or ambiguous. Furthermore, no follow-up after initial discharge of the neonates was done. It is not known if there were hospital readmissions for infection or if the neonates suffered any adverse outcome related to antibiotic treatment.

Present data suggest that that implementation of the Kaiser Permanente Neonatal Early Onset Sepsis calculator would result in an 87.2% reduction in the number of neonates unnecessarily treated with broad-spectrum antibiotics for suspected EOS, and 65% compared to the CDC and AAP guidelines. The CDC guidelines recommended empiric antibiotic treatment in 118 patients (35%) compared with 43 patients (12.9%) when using the EOS calculator. The present study showed the same sensitivity between the NEOS Calculator and CDC/AAP guideline. The evaluation with the NEOS calculator had a better specificity, negative likelihood ratio (LR-), and diagnostic accuracy for predicting EOS compared to the CDC/AAP guideline. However further studies in different settings are warranted, and for the implementation in the local context, its use should be carefully evaluated.

Research linking antibiotic use to obesity, asthma, and allergies is cause to rethink the threshold for initiating empiric antibiotics in neonates. A better strategy is needed to safely limit the sepsis evaluation and the use of broad-spectrum antibiotics in neonates born to mothers with chorioamnionitis and with suspected early onset sepsis. The sepsis calculator is relatively simple and clinically easy to use and significantly reduces the use of empiric antibiotic in newborn suspected with early onset sepsis. The application of this early onset sepsis calculator should be evaluated prospectively for the safety of this approach and good clinical observation remains very important.

#### **Declaration of Conflict of Interest**

The investigators declare no conflicts of interest in this study. We do not have any affiliation, financial or otherwise, with any pharmaceutical company, or medical device.

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## References

- Vergano S, Sharland M, Kazembe P, Mwasambo C, Heath P. Neonatal sepsis: An international perspective. *Arch Dis Child Fetal Neonatal Ed.* 2005; 90: 220-4. doi: 10.1136/adc.2002.022863
- Lawn JE. Every Newborn: progress, priorities and potential beyond survival. *Lancet* 2014; 384(9938): 189-205.
- Department of Health, Epidemiology Bureau. The 2012 Philippine Health Statistics 2012; 202-3.
- Martin RJ, Fanaroff AA, Walsh MC. The Immune System. Fanaroff and Martin's Neonatal-Perinatal Medicine: Diseases of the Fetus and Infant. 9th ed, vol 2. St Lou-is, MO: Mosby/Elsevier; 2011.
- Dars S, Malik S, Samreen I, Kazi RA. Maternal morbidity and perinatal outcome in preterm premature rupture of membranes before 37 weeks gestation. *Pak J Med Sci [In-ternet]*. 2014; 30(3): 626-9. doi: <http://dx.doi.org/10.12669/pjms.303.4853>
- Escobar GJ, Li DK, Amstrong MA, et al. Neonatal sepsis workup for infants  $\geq 2000$  grams at birth: A population-based study. *Pediatrics* 2000; 106: 256-63.
- Wortham JM, Hansen NI, Schrag SJ, et al. Chorioamnionitis and culture confirmed, early-onset neonatal infections. *Pediatrics*. 2016; 137: 1-11.
- Magsarili HK, Giroto JE, Bennett NJ, Nicolau DP. Making a case for pediatric anti-microbial stewardship programs. *Pharmacotherapy [Internet]*. 2015; 35(11): 1026-36. Available from: <http://doi.org/10.1002/phar.1647>
- Mukhopadhyay S, Eichenwald EC, Puopolo KM. Neonatal early-onset sepsis evaluations among well-appearing infants: projected impact of changes in CDC GBS guidelines. *J Perinatol [Internet]*. 2013; 33(3), 198-205. Available from: <http://doi.org/10.1038/jp.2012.96>
- Meropol SB, Edwards A. Development of the infant intestinal microbiome: A bird's eye view of a complex process. *Birth Defects Research Part C: Embryo Today: Reviews [Internet]*. 2015; 105(4): 228-39. Available from: <http://doi.org/10.1002/bdrc.21114>
- Cailes B, Vergnano S, Kortsalioudaki C, Heath P, Sharland M. The current and future roles of neonatal infection surveillance programmes in combating antimicrobial resistance. *Early Hum Dev [Internet]*. 2015; 91(11): 613-8. Available from: <http://doi.org/10.1016/j.earlhumdev.2015.08.012>
- Laxminarayan R, Matsoso P, Pant S, Brower C, Røttingen J-A., Klugman K, Davies S. Access to effective antimicrobials: A worldwide challenge. *Lancet [Internet]* 2016; 387(10014): 168-75. Available from: [http://doi.org/10.1016/S0140-6736\(15\)00474-2](http://doi.org/10.1016/S0140-6736(15)00474-2)
- Mahieu LM, De Dooy JJ, Cossey VR, et al. Internal and external validation of the NOSEP prediction score for nosocomial sepsis in neonates. *Crit Care Med* 2002; 30(7): 1459-66.
- Bekhof J, Reitsma JB, Kok JH, Van Straaten IH. Clinical signs to identify late-onset sepsis in preterm infants. *Eur J Pediatr* 2013; 172(4): 501-8.
- Puopolo KM, Escobar GJ. Early-onset sepsis: a predictive model based on maternal risk factors. *Curr Opin Pediatr [Internet]*. 2013; 25(2): 161-6. Available from: <http://doi.org/10.1097/MOP.0b013e32835e1f96>
- Shakib J, Buchi K, Smith E, Young PC. Management of newborns born to mothers with chorioamnionitis: Is it time for a kinder, gentler approach? *Acad Pediatr [Internet]*. 2015; 15(3): 340-4. Available from: <http://doi.org/10.1016/j.acap.2014.11.007>
- Sooter, R. Minimizing antibiotic exposure for infants at risk for early onset sepsis. 2016. (unpublished)
- Chan GJ, Lee AC, Baqui AH, Tan J, Black RE. Prevalence of early-onset neonatal infection among newborns of mothers with bacterial infection or colonization: a systemic review and meta-analysis. *BMC Infect Dis [Internet]*. 2015; 15: 118. doi: 10.1186/s12879015-0813-3
- Simonsen KA, Anderson-Berry AL, Shirley F, Delair SF, Davies HD. Early-onset neonatal sepsis. *Clin Microbiol Rev [Internet]*. 2014 Jan; 27(1): 21-47. doi: 10.1128/CMR.00031-13
- Zea-Vera A, Ochoa TJ. Challenges in the diagnosis and management of neonatal sepsis. *J Trop Pediatr. [Internet]*. 2015; 61: 1-13. doi: 10.1093/tropej/fmu079
- Kuppala VS, Meinzen-Derr J, Morrow AL, Schibler KR. Prolonged initial empirical antibiotic treatment is associated with adverse outcomes in premature infants. *J Pediatr [Internet]*. 2011; 159(5): 720-5. doi: 10.1016/j.jpeds.2011.05.033
- Escobar GJ, Puopolo KM, Wi S, Turk BJ, Kuzniewicz MW, Walsh EM, et al. Stratification of risk of early-onset sepsis in newborns  $\geq 34$  weeks' gestation. *Pediatrics* 2014; 133: 30-36. 8
- Kuzniewicz MW, Puopolo KM, Fischer A, et al. A quantitative, risk-based approach to the management of neonatal early-onset sepsis. *JAMA Pediatr [Internet]*. 2017; 171: 365-71.
- Carola D, Vasconcellos M, Sloane A, McElwee D, Edwards C, Greenspan J, Aghai ZH. Utility of early-onset sepsis risk calculator for neonates born to mothers with chorioamnionitis. *J Pediatr [Internet]*. 2018 Apr; 195: 48-52.e1. doi: 10.1016/j.jpeds.2017.11.045
- Buchiboyina A, Sharp M, Nathan E, Doherty D, Patole S. Implementation of the Neonatal Sepsis Calculator in an Australian tertiary perinatal centre. *Neonatology [Internet]*. 2018; 113: 379-82. doi: 10.1159/000487298

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# Quality of life among Filipino amputees after prosthetic rehabilitation at the UERMMMCI Philippine School of Prosthetics and Orthotics Charity Clinic

Hannah Lois G. Tarroja, MD and Cherryrich M. Cheng, MD

## Abstract

**Introduction** Amputation is often associated with depression, isolation and anxiety, resulting in changes in the functioning and quality of life of an individual. This study aimed to compare the quality of life of amputees before and after prosthetic rehabilitation and to determine the level of satisfaction with the services provided by the rehabilitation team.

**Methods** This was a longitudinal study conducted at the Philippine School of Prosthetics and Orthotics from 2016 to 2017. Quality of life was measured at baseline and at the end of prosthetic rehabilitation using the Short Form-36 version 2 Philippines (Tagalog) and compared. Patient satisfaction was determined using the UERMMMCI Out-Patient Satisfaction Survey. Statistical analysis was done using paired t-test and stratified analysis.

**Results** Twelve participants were included; majority were adult males and all were unemployed. There were no statistically significant changes in the quality of life of amputees after prosthetic rehabilitation. Stratification analysis revealed significant decreases in scores in bodily pain and general health scales for females. On the other hand, males had statistically significant increases in vitality scores. Participants were generally satisfied with the services they received.

**Conclusion** While no significant changes were observed for overall quality of life, certain aspects may be related to factors such as sex, comorbidities, and type of caregiver. Recommendations include further studies to explore other factors affecting quality of life among Filipino amputees after prosthetic rehabilitation.

**Keywords:** quality of life, prosthetic rehabilitation, Filipino amputees

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### Correspondence:

Cherryrich M. Cheng, MD, Department of Psychiatry, University of the East Ramon Magsaysay Memorial Medical Center Inc., 64 Aurora Boulevard, Barangay Doña Imelda, Quezon City, PH 1113; e-mail: cherryrichmd@gmail.com

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Department of Psychiatry, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

The World Health Organization defines quality of life (QoL) as “an individual’s perceptions of his position in life, in the context of cultural and value system in which they live and in relation to their goals, expectations, standards and concerns.”<sup>1</sup> Measuring quality of life in disease states is important since quality of life is related to functional outcome. Hence, changes in quality of life can greatly influence disease prognosis and determine treatment plans.<sup>2</sup>

The permanent disability commonly caused by amputation has been shown to affect patients’ quality of life. According to Deans, McFadyen and Rowe, amputation is often associated with depression,

isolation and anxiety, resulting in changes in the social functioning of an individual.<sup>3</sup> In addition, amputation results in a remarkable change of an individual's life and function.<sup>4</sup> A study by Sinha, Van Den Heuvel and Arokiasamy demonstrated that amputees had significantly lower quality of life levels compared to the general population.<sup>4</sup> This may be caused by different factors, including employment status, use of prosthetic devices, residual stump pain, and comorbidities. Moreover, Eiser, Darlington, Stride and Grimer stated that amputees are at risk for compromised quality of life in the categories of physical functioning, physical role performance, social functioning, vitality, pain and general health.<sup>5</sup> However, other studies on the quality of life of persons with disabilities reveal conflicting results. Albrecht and Devlieger concluded that participants with disabilities may have higher quality of life levels when they have an understanding of their condition, are able to adapt to their new condition and establish order in their lives.<sup>6</sup>

Optimal function is the usual goal of treatment during the rehabilitation of amputees; this can be achieved through prosthetic rehabilitation. Prosthetic rehabilitation involves an assessment of the amputee, fitting, casting, aligning and physical therapy.<sup>7</sup> Additionally, it screens for potential problems such as psychological and social issues, and monitors changes or response to treatment.<sup>8</sup> Hence, the general function of an amputee can be significantly improved through prosthetic rehabilitation. For example, a case report on a 15-year-old Filipino male diagnosed with proximal femoral focal deficiency referred for prosthetic rehabilitation found that prosthetic rehabilitation promoted positive self-image and had benefits such as safe mobility, independent ambulation, and participation in recreational activities.<sup>9</sup>

In the Western setting, a study on patients with deformed or missing ears demonstrated that implant-supported auricular prosthesis placement led to significant improvements in the quality of life of patients in the body image, social interaction and mood domains.<sup>10</sup> Moreover, Gallagher and MacLachlan revealed that increased frequency and duration of prosthesis use was associated with significant improvement in specific quality of life domains.<sup>11</sup>

However, a study by Hagberg and Branemark revealed conflicting results: In their study, certain factors related to prosthesis use, such as sweating in the prosthetic socket, skin irritation from the socket,

limb pain and inability to walk quickly, was associated with significantly lower quality of life.<sup>12</sup> Findings from this study were supported by research which reported significantly lower scores in physical and mental quality of life scales among amputees with prostheses compared to the general population.<sup>13</sup>

In Southeast Asia, there are limited studies regarding the quality of life among amputees after prosthetic rehabilitation. Hence, the objective of this study was to compare the quality of life of amputees before and after prosthetic rehabilitation. Specifically, the study sought to 1) describe the demographic profile of amputees undergoing prosthetic rehabilitation; 2) determine the effect of specific demographic characteristics, co-morbidities and indication for amputation; and 3) determine the level of satisfaction with the services provided by the rehabilitation team. It is hoped that study results may contribute to the limited studies done on quality of life after prosthetic rehabilitation and aid in the holistic management of the amputees.

## Methods

The study utilized a longitudinal design that measured the quality of life of amputees before and after prosthetic rehabilitation and was conducted from November 2016 to November 2017 at the University of the East Ramon Magsaysay Memorial Medical Center, Inc. Philippine School of Prosthetics and Orthotics (UERMMMCI PSPO).

The study utilized purposive sampling with inclusion criteria of 1) Filipino citizen over 18 years of age, 2) with unilateral lower extremity amputation, 3) seeking prosthetic rehabilitation. Exclusion criteria were 1) inability to provide informed consent, and 2) history of previous prosthetic rehabilitation, while the withdrawal criterion was refusal to continue study participation. The computed sample size using the following formula was eight participants with a level of significance of 95%. Standard deviation was set at 7 and a mean change of 7, based on a prospective study of the health-related quality of life for 12 participants treated with osseointegrated transfemoral amputation prosthesis.<sup>15</sup>

The UERMMMCI Ethics Review Committee approved this study. Written informed consent was secured from all participants by the investigators. Anonymity was ensured through the use of sample codes. Only the investigators had access to the data.

A demographic questionnaire was developed for this study. The Short Form-36 version 2 Philippines (Tagalog) is a valid and reliable 36-item self-administered questionnaire translated into Filipino from the English version of Short Form-36 version 2. It assesses changes in health status and is comprised of eight scales: 1) physical functioning, 2) role physical functioning, 3) bodily pain, 4) general health, 5) vitality, 6) social functioning, 7) role emotional functioning, and 8) mental health. Results from these scales are presented in two summary measures, the physical and the mental component scores, respectively. It is scored from zero to one hundred, with higher scores indicating better quality of life. The SF-36v2 Philippines has shown good internal consistency with Cronbach's alpha coefficient exceeding the recommended value of 0.70 for all scales except GH (0.62), VT (0.51) and SF (0.54).<sup>14</sup> The UERMMMCI Out-Patient Satisfaction Survey (PSS) is a survey developed by UERMMMCI which measures patient satisfaction in their experience in four categories: 1) personnel, 2) service, 3) facility and 4) overall experience.

After securing informed consent from eligible participants, demographic information was gathered, and baseline quality of life was measured using the SF-36v2 Philippines. Upon completion of prosthetic rehabilitation, participants' quality of life was measured again, and they were asked to complete the UERMMMCI PSS to assess the overall satisfaction provided during prosthetic rehabilitation.

Demographic characteristics and patient satisfaction were described by measures of central tendency and descriptive statistics, while paired t-test was used to compare quality of life before and after prosthetic rehabilitation. Stratified analysis was done for possible confounders such as the presence of co-morbidities, reasons for amputation, and other demographic variables. The significance level for all statistical analysis was set at  $p < 0.05$ . Data analysis was performed using SPSS version 20 software.

## Results

Sixteen participants were recruited from the UERMMMCI PSPO to participate in the study. One patient was excluded due to death prior to rehabilitation and three were still undergoing prosthetic rehabilitation when the study ended leaving twelve participants who completed prosthetic

rehabilitation. The average age of the participants was 52 years; the youngest was 22 and the oldest was 69 years. Majority were male, married and unemployed. Three participants finished primary education, five finished secondary education, and four finished college (Table 1).

Majority of the participants were amputated in the leg (75%) due to complications of diabetes mellitus and provided with transtibial prostheses. The average length of time spent being an amputee was 2.31 years, while the average length of time

**Table 1.** Demographic characteristics of 12 participants.

Characteristic	n (%)
Age (mean, yr)	52.08
Sex	
Male	8 (66.67)
Female	4 (33.33)
Marital status	
Married	11 (91.67)
Single	0
Separated	1 (8.33)
Educational attainment	
Elementary	3 (25)
Secondary	5 (41.67)
College	4 (33.33)
Body part amputated	
Thigh	2 (16.67)
Leg	9 (75)
Foot	1 (8.33)
Indication for amputation	
Complications of diabetes	6 (50)
Trauma	5 (41.67)
Cancer	1 (8.33)
Caregiver	
Spouse	8 (66.67)
Sibling	2 (16.67)
Parents	1 (8.33)
Children	1 (8.33)
Type of prosthesis	
Transtibial	10 (83.33)
Transfemoral	2 (16.67)
Co-morbidities	
Cardiac	4 (33.33)
Renal	2 (16.67)
Endocrine	7 (58.33)
None	4 (33.33)

spent with the prosthesis was 5 months as seen in Table 1. After undergoing amputation, most of the participants were cared for by their spouse. Out of the 12 participants, eight had coexisting diseases, including diabetes mellitus, hypertension, kidney disease, and dyslipidemia.

There was no significant difference in the quality of life scores at the end of prosthetic rehabilitation

compared with the baseline scores in both the physical (40.4 vs 40.8,  $p = 0.856$ ) and mental (46.2 vs 56.0,  $p = 0.957$ ) domains and their respective components, as seen in Table 2. There were significant decreases in the QoL scores of the women in bodily pain (86.5 vs 39.2,  $p = 0.001$ ), general health (74.0 vs 56.5,  $p = 0.019$ ), and an increase in vitality among the men (57.0 vs 63.3,  $p = 0.05$ ) as seen in Table 3. There

**Table 2.** Comparison of physical and mental component scores before and after prosthetic rehabilitation of 12 participants.

	Baseline $\pm$ SD	After $\pm$ SD	P-value
Physical components	40.83 $\pm$ 6.82	40.45 $\pm$ 5.56	0.856
Physical functioning	45.42 $\pm$ 22.20	51.67 $\pm$ 16.00	0.179
Role physical functioning	41.15 $\pm$ 23.90	47.40 $\pm$ 10.81	0.477
Bodily pain	60.75 $\pm$ 27.34	46.75 $\pm$ 15.92	0.155
General health	58.00 $\pm$ 21.62	56.33 $\pm$ 26.36	0.8
Mental components	46.02 $\pm$ 6.76	46.15 $\pm$ 7.40	0.957
Vitality	62.50 $\pm$ 17.68	63.02 $\pm$ 11.75	0.896
Social functioning	60.42 $\pm$ 21.87	59.38 $\pm$ 21.40	0.898
Role emotional functioning	51.39 $\pm$ 24.83	52.08 $\pm$ 19.82	0.946
Mental health	67.92 $\pm$ 11.96	69.17 $\pm$ 12.22	0.704

**Table 3.** Comparison of physical and mental component scores before and after prosthetic rehabilitation stratified by sex (N=12).

	Baseline $\pm$ SD	After $\pm$ SD	P-value
Physical components			
Physical functioning	45.42 $\pm$ 22.20	51.67 $\pm$ 16.00	0.179
Male	41.25 $\pm$ 23.56	50.63 $\pm$ 15.68	0.18
Female	53.75 $\pm$ 19.31	53.75 $\pm$ 18.87	1
Role physical functioning	41.15 $\pm$ 23.90	47.4 $\pm$ 10.81	0.477
Male	35.94 $\pm$ 24.94	46.88 $\pm$ 11.57	0.387
Female	51.56 $\pm$ 20.65	48.44 $\pm$ 10.67	0.769
Bodily pain	60.75 $\pm$ 27.34	46.75 $\pm$ 15.92	0.155
Male	47.88 $\pm$ 21.63	50.50 $\pm$ 16.81	0.773
Female	86.50 $\pm$ 17.99	39.25 $\pm$ 12.53	0.001
General health	58.00 $\pm$ 21.62	56.33 $\pm$ 26.36	0.798
Male	50.00 $\pm$ 19.49	56.25 $\pm$ 31.05	0.463
Female	74.00 $\pm$ 17.78	56.50 $\pm$ 17.25	0.019
Mental components			
Vitality	62.50 $\pm$ 17.68	63.02 $\pm$ 11.75	0.896
Male	57.03 $\pm$ 15.10	63.28 $\pm$ 12.69	0.05
Female	73.44 $\pm$ 19.35	62.50 $\pm$ 11.41	0.275
Social functioning	60.42 $\pm$ 21.87	59.38 $\pm$ 21.40	0.898
Male	51.56 $\pm$ 18.22	54.69 $\pm$ 24.94	0.794
Female	78.13 $\pm$ 18.75	68.75 $\pm$ 7.22	0.215
Role emotional functioning	51.39 $\pm$ 24.83	52.08 $\pm$ 19.82	0.946
Male	40.63 $\pm$ 22.02	47.92 $\pm$ 15.91	0.567
Female	72.92 $\pm$ 14.23	60.42 $\pm$ 26.68	0.527
Mental health	67.92 $\pm$ 11.96	69.17 $\pm$ 12.22	0.704
Male	62.50 $\pm$ 8.45	66.88 $\pm$ 13.61	0.329
Female	78.75 $\pm$ 11.09	73.75 $\pm$ 8.54	0.252

was a significant decrease in the general health of participants when the caregiver was a sibling (64.5 vs 38.5,  $p = 0.024$ ) (Table 4). Aside from these specific components, there were no significant differences in the physical and mental domains when age, sex, educational attainment, caregiver, co-morbidities, indication for amputation, body part amputated and type of prosthesis were considered.

Twelve participants (Table 5) answered the UERMMCI PSS in their experience in four categories: 1) personnel, 2) service, 3) facility and 4) overall experience. Majority of the participants were satisfied (66.7%) with the personnel during their prosthetic rehabilitation. Seven of the participants were very satisfied with the facility and the service rendered while six were very satisfied with their overall experience.

### Discussion

Majority of the participants were male and married, and all were unemployed prior to prosthetic rehabilitation. These characteristics were consistent with the study done by Sinha, which found that two-thirds of the participants comprised of male, and half were unemployed.<sup>4</sup> Most of the participants underwent amputation of the leg and received transtibial prosthesis due to complications of diabetes mellitus and trauma similar to data reported in other studies.<sup>4,12,13,16</sup>

Results of the study yielded no statistically significant changes in the physical component scores

post-prosthetic rehabilitation. Although reports from studies reveal improved quality of life after prosthetic rehabilitation, the results of this study are congruent with other studies which demonstrated that quality of life of an amputee may not improve despite prosthetic rehabilitation.<sup>9,10,12,13,15</sup>

**Table 5.** Results of patient satisfaction survey of 12 participants.

Patient Satisfaction	n (%)
<b>Personnel</b>	
Very satisfied	4 (33.3%)
Satisfied	8 (66.7%)
Dissatisfied	0
Very dissatisfied	0
<b>Service</b>	
Very satisfied	7 (58.3%)
Satisfied	4 (33.3%)
Dissatisfied	0
Very dissatisfied	0
N/A	1 (8.3%)
<b>Facility</b>	
Very satisfied	7 (58.3)
Satisfied	5 (41.7%)
Dissatisfied	0
Very dissatisfied	0
<b>Overall Experience</b>	
Very satisfied	6 (50%)
Satisfied	4 (33.3%)
Dissatisfied	2 (16.7%)
Very dissatisfied	0

**Table 4.** Comparison of physical component scores before and after prosthetic rehabilitation stratified by caregiver (N=12).

	Baseline ± SD	After ± SD	P-value
Physical functioning	45.42 ± 22.20	51.67 ± 16.00	0.179
Spouse	45.00 ± 22.99	52.50 ± 18.51	0.096
Sibling	30.00 ± 7.07	50.00 ± 14.14	0.41
Role physical functioning	41.15 ± 23.90	47.4 ± 10.81	0.477
Spouse	41.41 ± 28.73	45.31 ± 10.95	0.771
Sibling	31.25 ± 8.84	43.75 ± 8.84	-
Bodily pain	60.75 ± 27.34	46.75 ± 15.92	0.155
Spouse	60.00 ± 32.75	48.13 ± 16.37	0.374
Sibling	68.00 ± 22.63	46.00 ± 7.07	0.485
General health	58 ± 21.62	56.33 ± 26.36	0.798
Spouse	59.38 ± 24.73	62.75 ± 29.72	0.689
Sibling	64.50 ± 17.68	38.50 ± 19.09	0.024*

The mean duration of prosthetic use for the study participants was five months, which was relatively short, compared to another longitudinal study with a 2-year follow-up period. Hence, it is possible that the participants were adjusting to the prosthesis at the time of the follow-up. This may be a critical factor associated with physical health quality of life scores, since a longer duration of prosthesis use is associated with better adjustment to limitations, physical capabilities and health rating.<sup>8</sup> As amputation and prosthetic rehabilitation involves the physical well-being and overall quality of life of the amputee, physical factors that affect prosthetic use should be assessed and addressed by the rehabilitation team.

In this study, there were no statistically significant changes in mental health scores after prosthetic rehabilitation. These findings support data from a study by Tam, which likewise revealed no significant changes in mental health scores at different time points.<sup>10</sup> Current study results are incongruent with the findings of De Leon and Inciong, and Tam who found that there were significantly higher mental component and role emotional functioning scores, as well as improved self-image and social interaction after prosthetic rehabilitation.<sup>9,10</sup> However, these studies utilized a different population group compared to the present study – hence, more studies may be needed to investigate the quality of life among Filipinos receiving lower limb prosthesis.

Stratified analysis was done to determine changes in quality of life scores based on the participant's demographic data, body part amputated, indication for amputation, type of prosthesis received, caregivers and co-morbidities. Interestingly, there was a statistically significant decrease of bodily pain and general health scores among females, supporting previous results by Hagberg which demonstrated lower scores in physical functioning, bodily pain, vitality and physical component summary scores among females after prosthetic rehabilitation.<sup>15</sup> A possible explanation may be the significantly higher importance placed by women on prosthesis appearance and utility compared to men.<sup>13</sup> In relation to this, a study showed that women have a higher rate of lower back pain and other perceived problems related to prosthesis use.<sup>15</sup> These perceived problems include sores or skin irritation on the residual limb, phantom limb pain and discomfort in sitting when using the prosthesis. Consequently, these perceived problems may affect perception of their general health and their quality of life.

Furthermore, results of the study revealed that males had a significantly increased vitality scores after prosthetic rehabilitation, which supports findings from a study which revealed that males show better adjustment to the prosthesis which influences their motivation and energy to use the prosthesis longer.<sup>4</sup> It has also been hypothesized that males have higher scores in both physical and mental health, specifically vitality, compared to females.<sup>15</sup>

Finally, participants cared for by their siblings showed significantly lower scores under the general health scale compared to those who cared for by their spouse, children or parents. It may be hypothesized that the participants preferred to be cared for by their own spouse rather than their siblings; however, less data is known on the effect of primary caregiver and quality of life. Nevertheless, it was pointed out by Legro that support and encouragement from family members play an important role in the adjustment period of prosthesis.<sup>13</sup> Additional exploration on the family dynamics of the participants may be helpful in explaining this result.

The PSS revealed that most of the participants were satisfied with the personnel involved, services rendered and facilities provided during prosthetic rehabilitation. Overall, majority of the participants were very satisfied with their prosthetic rehabilitation provided by the UERMMMCI PSPO Charity Clinic. In relation to this, a study by Pezzin revealed that amputees depended on the prosthetists for routine adjustments of their prosthesis based on three dimensions: technical skills, information giving and interpersonal manner.<sup>17</sup> Hence, the services provided have a big role in the overall well-being of the amputee undergoing prosthetic rehabilitation. Good prosthetist services may be vital in influencing quality of life scores after prosthetic rehabilitation.<sup>13</sup>

Conversely, two participants were dissatisfied with their overall experience during prosthetic rehabilitation. The study by Pezzin found that dissatisfaction was often related to the prosthetist's interpersonal skills such as being in a hurry, failure to explain problems, or inability to discuss issues with the patients.<sup>17</sup> Hence, reasons behind participant dissatisfaction should be explored for further enhancement of services in the future. Study limitations include the relatively small sample size, restricted setting, and short duration of the follow up. Hence, the sample population may not have been

representative of the larger population of Filipino amputees undergoing prosthetic rehabilitation.

The study sought to investigate the quality of life of amputees before and after prosthetic rehabilitation. It also sought to describe the demographic characteristics of these patients as well as determine their level of satisfaction with the services provided by the rehabilitation team.

Generally, the demographic characteristics of the participants were similar to Western studies conducted on quality of life and prosthetic rehabilitation -- specifically, majority of the participants were male, married, with lower extremity amputation due to complications of diabetes mellitus and transtibial prosthesis placement. Results revealed no statistically significant changes in the quality of life of amputees after prosthetic rehabilitation; however, certain subscales were affected by other factors such as sex, presence of co-morbidities and caregiver presence. As there have been no previous Southeast Asian studies investigating the quality of life of adults after prosthetic rehabilitation, it is hoped that this study can contribute to the current field of knowledge and aid in improvement of quality of life for amputees undergoing prosthetic rehabilitation. Recommendations include the involvement of multiple centers and use of larger study population as well as the use of a longitudinal study design with a longer time frame.

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### References

1. World Health Organization. Measuring quality of life: The World Health Organization quality of life instruments [Internet]. 1997. Available from: [http://www.who.int/mental\\_health/media/68.pdf](http://www.who.int/mental_health/media/68.pdf)
2. Higginson IJ, Carr, AJ. Measuring quality of life: Using quality of life measures in the clinical setting. *BMJ* [Internet]. 2001; 322: 1297-300. doi: 10.1136/bmj.322.7297.1297
3. Deans SA, McFadyen AK, Rowe PJ. Physical activity and quality of life: A study of a lower-limb amputee population. *Prosthet Orthot Int* [Internet]. 2008; 32 (2): 186-200. doi: 10.1080/03093640802016514
4. Sinha R, Van Den Heuvel WJA, Arokiasamy P. Factors affecting quality of life in lower limb amputees. *Prosthet Orthot Int* [Internet]. 2011; 35(1): 90-6. doi: 10.1177/0309364610397087
5. Eiser C, Darlington ASE, Stride CB, Grimer R. Quality of life implications as a consequence of surgery: Limb salvage, primary and secondary amputation. *Sarcoma* [Internet]. 2001; 5: 185-95. doi: 10.1080/13577140120099173
6. Albrecht GL, Devlieger PJ. The disability paradox: high quality of life against all odds. *Soc Sci Med* [Internet]. 1999; 48: 977-88. doi:10.1016/S0277-9536(98)00411-0
7. Cadavillo JV, Regidor JG, Serdone NR, Timbang KV. Effects of prosthetic rehabilitation on the functional mobility of patients with unilateral transtibial amputation: A pilot study. 2016.
8. Gallagher P, Desmond D. Measuring quality of life in prosthetic practice: Benefits and challenges. *Prosthet Orthot Int* [Internet]. 2007; 31(2): 167-76. doi:10.1080/03093640600988633
9. De Leon KP, Inciong GD. Prosthesis for a patient with proximal femoral focal deficiency: a case report. *Acta Medica Philippina* [Internet]. 2010; 44 (2): 67-71. doi:10.1080/03093640008726518
10. Tam CK, McGrath CP, Mun Yin Ho S, Ho Nang Pow E, Wai Kuen Luk H, Cheung K. Psychosocial and quality of life outcomes of prosthetic auricular rehabilitation with CAD/CAM technology. *Int J Dentist* [Internet]. 2014: 1-12. doi:10.1155/2014/393571
11. Gallagher P, MacLachlan M. The Trinity Amputation and Prosthesis Experience Scales and quality of life in people with lower-limb amputation. *Arch Phys Med Rehabil* [Internet]. 2004; 85: 730-6. doi: 10.1016/j.apmr.2003.07.009
12. Hagberg K, Branemark R. Consequences of non-vascular transfemoral amputation: A survey of quality of life, prosthetic use and problems. *Prosthet Orthot Int* [Internet]. 2001; 25: 186-94. doi: 10.1080/03093640108726601

13. Legro MW, Reiber G, del Aguila M, et al. Issues of importance reported by persons with lower limb amputations and prosthesis. *J Rehabil Res Dev* [Internet]. 1999; 36 (3): 155-63. Available from: <https://www.rehab.research.va.gov/jour/99/36/3/legro.htm>
14. Castillo-Carandang NT, Sison OT, Grefal ML, et. Al. A community-based validation study of the Short Form-36 version 2 Philippines (Tagalog) in two cities in the Philippines. *PLOS One* 8 [Internet]. 2013; (12): e83794. doi: 10.1371/journal.pone.0083794
15. Hagberg K, Brånemark R, Gunterberg B, Rydevik B. Osseointegrated transfemoral amputation prostheses: Prospective results of general and condition-specific quality of life in 18 patients with 2-year follow-up. *Prosthet Orthot Int* [Internet]. 2008 Mar; 32(1): 29-41. doi: 10.1080/03093640701553922
16. Cox PSL, Williams SKP, Weaver SR. Life after lower extremity amputation in diabetes. *West Indian Med J* [Internet]. 2011; 60 (5): 536-40. doi: 10.1016/j.fas.2007.10.006
17. Pezzin LE, Dillingham TR, MacKenzie EJ, Ephraim P, Rossbach P. Use and satisfaction with prosthetic limb devices and related services. *Arch Phys Med Rehabil* [Internet] 2004; 85: 723-9. doi: 10.1016/j.apmr.2003.06.002

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# A cross-sectional study on the HIV-related knowledge, attitudes and practices of male youth having sex with men in Metro Manila

Beatriz Z. Arellano; Aliza Mariel B. Armamento, RMT; Donita N. Arnesto; John Paul S. Arquines, RMT; Joanna Mae S. Avanceña, RMT; Erica Charleen M. Baluan; Axl Rose B. Bangit, RMT; Reshan D. Baoas, MS; Fatima Mae B. Barateta, RCh; Angela Carmina Q. Barroquillo, PTRP; Calvin EJ R. Bautista, RPh; Shaila P. Bautista and Jose Ronilo G. Juangco, MD, MPH

## Abstract

**Introduction** The Philippines continues to see an increasing trend in diagnosed cases of HIV. The predominant population of males having sex with men (MSM) is the 25-34 years age group, but trends show an increasing incidence in younger populations. This study aimed to determine the participants' HIV/AIDS related knowledge, attitudes and practices and its relationships with the sociodemographic factors of youth MSM in Metro Manila.

**Methods** The researchers used an analytic, cross-sectional design using a self-administered questionnaire. The survey tool consisted on 24 items on knowledge and 12 on attitudes. Respondents were classified into "inadequate" and "adequate" knowledge, and "poor" and "good" attitudes for the analysis. Purposive sampling was used to recruit 251 respondents.

**Results** The mean age of the respondents was  $22 \pm 1.7$  years. Most of the respondents had high HIV knowledge and good attitudes towards PLHIV but still engaged in risky sexual practices. Those who had undergone HIV testing were significantly more likely to have good knowledge regarding HIV/AIDS. With regards to attitudes, those not in a relationship were significantly more likely to have positive attitudes towards PLHIV and HIV/AIDS.

**Conclusion** HIV testing status positively influences HIV/AIDS-related knowledge while being single positively influences attitudes towards PLHIV and HIV/AIDS. No significant findings were found between age, educational attainment and religious affiliation with knowledge and attitudes.

**Keywords:** human immunodeficiency virus; knowledge, attitudes and practices; men who time sex with men

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## Correspondence:

Jose Ronilo G. Juangco, MD, MPH, Department of Preventive and Community Medicine, College of Medicine, University of the East Ramon Magsaysay Memorial Medical Center Inc., 64 Aurora Boulevard, Barangay Doña Imelda, Quezon City, PH 1113; e-mail: ronniejuangco@gmail.com

Department of Preventive and Community Medicine, College of Medicine, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

During the advent of human immunodeficiency virus (HIV) infections in the Philippines, its transmission was described as "slow and low."<sup>1</sup> Though the prevalence in the population is still reported to be at less than one percent, the increase in the incidence of the disease since the 2000s has made health authorities reconsider this notion.<sup>2</sup> In a September 2018 report by the Department of Health (DOH), 32 Filipinos are said to be diagnosed with HIV each day. There was a 19% increase in diagnosed

individuals compared to the same period during the previous year. With regards to sex, males were noted to be significantly more at risk than females, with 94% of diagnosed cases being men. Related to this, sexual contact was the most common mode of transmission among men who have sex with men (MSM). Almost half of these MSM were found to be from the National Capital Region.<sup>3</sup>

In recent years, the population of people living with HIV (PLHIV) has been noted to be getting younger and younger.<sup>3</sup> It has been said that two out of three new HIV infections were among 15-24 year-old men.<sup>4</sup> Younger men may be at an increased risk for acquiring HIV due to various factors. The median sexual debut in both males and females in the country is at 14-19 years old. Poor knowledge leading to misconceptions and belief in HIV myths coupled with liberal attitudes of the youth regarding sex can lead to inconsistent and poor sexual health practices.<sup>5</sup> There have been multiple studies on the youth's level of knowledge regarding sexual health, but none have focused on MSM. More so, local sexual education may be lacking with regards to information regarding safe same-sex intercourse and instructions on the use of protection which may cause further disadvantage to MSM.<sup>6-9</sup> Though studies on attitudes regarding HIV have been done, the populations were either of a different sex, of a different race, or of a different age group which may not be generalizable due to cultural or generational differences. Therefore, this study aimed to capture the experience that may be unique to young Filipino MSM.

The objective of the study was to determine the sociodemographic information and the HIV-related sexual health knowledge, attitudes and practices (KAP) of Filipino men having sex with men, living in Metro Manila, aged 18-24 years; and to determine if certain sociodemographic factors have an effect on their HIV-related KAP.

## Methods

The study applied an observational analytical cross-sectional design where the subjects voluntarily answered a self-administered questionnaire to determine their sociodemographic factors and HIV-related knowledge, attitude and practices. The participants included in the study were Filipino MSM currently residing in Metro Manila, and aged 18-24 years. Subjects who indicated they did not

have any formal education were excluded, as the English questionnaire may adversely affect proper comprehension, thus negatively affecting their scores. The respondents were asked to review and agree to an informed consent prior to the survey proper.

The recruitment of subjects was done through two forms of non-probability sampling: Snowball sampling was done through the use of both online and offline personal social networks and in coordination with local LGBTQ+ organizations. Convenience sampling was done by visiting locations frequented by the LGBTQ+ community such as gay bars and pride events. The minimum sample population was calculated using the formula for sample size for a proportion and population data from the study conducted by Gangcuangco, Tan and Berba.<sup>11</sup> One hundred and ninety-eight was the initial computed minimum sample size for the current study.

The researchers utilized the questionnaire from a study by Shokoohi. It consists of 24 true or false questions on HIV-related knowledge, with 14 questions focusing on HIV transmission and 10 questions regarding the diagnosis, treatment and prevention of the condition. There were 12 statements regarding attitudes, to which the participants could state if they agree or disagree. Questions on practices focused on risky sexual behaviors, drug use and sources of information regarding HIV/AIDS. Content validity was assessed through expert opinion and internal validity was assessed by measuring the Cronbach alpha coefficient which yielded 0.781 for knowledge of HIV modes of transmission, 0.751 for knowledge of HIV diagnosis, prevention and treatment, and 0.867 for attitudes towards PLHIV and HIV/AIDS.<sup>10</sup> Both physical and online questionnaires were made available. The online questionnaire was made through Google Forms.

Face-to-face surveys were performed in a well-lit, quiet area outside venues frequented by MSM youth. The participants were handed tablets containing both the consent and survey forms, with a member of the research team on stand-by to address questions or clarifications. The online survey was performed through various social networking sites and in coordination with local LGBTQ+ organizations. A Facebook page was created to facilitate communication with the organizations. A member of the research team coordinated with a key person in the organizations in disseminating the questionnaire and answering participant questions regarding the study. Individual

MSM youth were also personally messaged by the researchers and were asked to voluntarily participate in the study. Participants were also asked to refer the study to other eligible individuals they may know of.

Data were encoded and analyzed with Microsoft Excel version 16.16.2. Frequencies for knowledge, attitude and practice scores were obtained. The HIV-related knowledge was based on the number of correct answers that were answered for the knowledge portion of the questionnaire. The attribution of scores were based from the source questionnaire. Getting 12 or fewer items correct was regarded as “low knowledge”, scores of 13 to 18 was regarded as “moderate knowledge” and scores of 19 to 24 was regarded as “high knowledge.” Attitudes were categorized as “negative” when there are 6 or fewer positive responses, “neutral” when there are 7 to 9 positive responses and “positive” when there are 10 to 12 positive responses.<sup>10</sup> For the purpose of analysis, those with “low” and “moderate” knowledge were grouped under “inadequate knowledge” while those with “high knowledge” were classified as “adequate knowledge.” Those with “negative” to “neutral” attitudes were grouped under “poor attitudes” while those with positive attitudes were placed under “good attitudes.”

Participants were categorized according to sociodemographic factors such as age, religious affiliation, educational attainment and marital status to correlate the values obtained with their knowledge, attitudes, and practices. This is to find out if certain sociodemographic factors are associated with the respondents’ HIV-related KAP. PRR, confidence intervals, and p-values were obtained. P-values less than 0.05 were considered statistically significant.

Ethics approval was obtained from the Research Institute for Health Sciences Ethics Review Committee. Informed consent was obtained from each participant. Each respondent was assigned a code number. The data were de-identified and anonymized, and only personal information needed for the study was collected. The data collected was accessible only to the researchers.

## Results

There were a total of 251 respondents combined from the online survey and face-to-face interviews. The mean age of the participants was 22 years, ranging from 18 to 24 years. Majority (68%) were Roman

Catholics, single (72%), and negative for HIV (62%), as seen in Table 1.

**Table 1.** Demographic information of participants.

Variable	n (%)
Age (yr)	
18	7 (2.79)
19	23 (9.16)
20	26 (10.36)
21	30 (11.95)
22	40 (15.94)
23	48 (19.12)
24	77 (30.68)
Mean ± SD	22 ± 1.79
Religion	
Catholic Christian	172 (68.53)
Non-Catholic Christian	29 (11.55)
Islam	2 (0.80)
Non-religious	48 (19.12)
Relationship Status	
Single	181 (72.11)
In a relationship	69 (27.49)
Separated	1 (0.40)
Educational Attainment	
High school graduate	48 (19.12)
College graduate	168 (66.93)
Post-graduate or higher	35 (13.94)
Sexual Orientation	
Heterosexual	26 (10.36)
Homosexual	123 (48.00)
Bisexual	94 (37.45)
Transgender	3 (1.20)
Others (Demisexual, pansexual, queer)	5 (1.99)
HIV Status	
Positive	15 (5.98)
Negative	157 (62.55)
Never tested	79 (31.47)

### *Association of Sociodemographic Factors with Knowledge*

Overall, 92.83% of the participants had high knowledge scores. None of the sociodemographic factors was associated with having high knowledge scores (Table 2).

*Knowledge on Modes of Transmission*

Most participants know the modes of HIV transmission and identified the risks of piercing (89%), tattooing and bloodletting (94%) with HIV-infected equipment, sharing syringes (98%) with PLHIV and unprotected sex (99%). Most participants also correctly identified the risk of transmission of an HIV-infected woman to her baby during pregnancy (94%) but a lower percentage identified the risk of transmission through breastfeeding (74%). Only around half of the participants identified the risk of transmission using dental instruments (52%). Majority knew that HIV cannot be spread by sharing food (94%), toiletries (92%) and haircut kit (87%) with PLHIV, and that it cannot be spread by using public bathrooms (98%), by kissing or hugging PLHIV (94%), by insect bites (89%), or by contacting sneeze, cough, saliva of PLHIV (89% correct).

*Knowledge on Prevention, Diagnosis and Treatment*

Most participants know that PLHIV cannot be identified by their appearance (92%), that

they can have a normal life (97%) by following a healthy lifestyle and taking treatment, and that early diagnosis and treatment increases PLHIV's life expectancy (96%). Majority knew that blood testing is the only definite means of diagnosis (82%), that treatment (80%) and condom use (98%) can reduce the chance of HIV transmission while having multiple sex partners (97%) and presence of an STD (87%) increases it. Around 92% knew that there is no cure for AIDS and only around 79% knew that there is no vaccine that prevents AIDS.

*Attitudes Towards PLHIV*

Most participants have good attitude towards HIV/AIDS (87.65%). All of the surveyed individuals who were HIV-positive have good attitude towards their condition. The greatest agreement is at 99.20% stating that they can share a table with a PLHIV. Only relationship status has a significant association (PRR 1.11,  $p = 0.033$ ) with attitudes towards PLHIV (Table 3).

**Table 2.** HIV/AIDS-related knowledge of Filipino youth MSM in association with sociodemographic factors.

	<b>Adequate Knowledge</b>	<b>Inadequate Knowledge</b>	<b>PRR</b>	<b>95%CI</b>	<b>P</b>
<b>Age</b>					
18-21	79	7	0.9851	0.9137, 1.062	0.342
22-24	152	11			
<b>Relationship status</b>					
Single	168	14	0.9799	0.9118, 1.053	0.318
In a relationship	65	4			
<b>Educational attainment</b>					
High School Graduate	44	4	0.9846	0.897, 1.081	0.354
College Graduate or higher	189	14			
<b>Religious Affiliation</b>					
With	185	18	*	*	*
Without	0	48			
<b>HIV Testing Status</b>					
Tested	163	9	1.076	0.9886, 1.172	0.027
Never tested	70	9			

**Table 3.** HIV/AIDS-related attitudes of Filipino youth MSM in association with sociodemographic factors.

	Good Attitudes	Poor Attitudes	PRR	95% CI	P
<b>Age</b>					
18-21	77	9	1.033	0.9406, 1.135	0.264
22-24	143	22			
<b>Relationship status</b>					
Single	164	18	1.11	0.9813, 1.25	0.0330
In a relationship	56	13			
<b>Educational attainment</b>					
High School Graduate	43	5	1.095	0.9676, 1.239	0.106
College Graduate or higher	177	26			
<b>Religious Affiliation</b>					
With	177	26	0.9733	0.872, 1.086	0.341
Without	43	5			
<b>HIV Testing Status</b>					
Tested	150	22	0.9842	0.8927, 1.085	0.386
Never tested	70	9			

### *Practices Related to HIV/AIDS*

Majority of the participants do not engage in risky behaviors. Only 5.1% have injected illicit or stimulant drugs and 2% have used shared or unsterile syringes. However, half of the participants (53.1%) have had sex with someone other than their spouse or partner and less than half were consistent with the use of condom (45.3%). The main reason for the inconsistent use of condom was due to their own preference (15%) and that they don't think it is necessary (15.4%). Only 41.7% have used alcohol/ drugs during/ before sex and more than half of them have used a condom on their last sexual intercourse (59.8%). Moreover, nearly half had tested for HIV for the past year (49.6%) and only a total of 37.8% had never tested for HIV.

## **Discussion**

### *Knowledge*

Generally, majority of the respondents have high knowledge about HIV transmission. Table 3 shows that for each question on the modes of transmission, at least 70% of the respondents answered the questions correctly. However, a significant number (47.2%) of

respondents had a misconception that one cannot get HIV by using dental instruments used for PLHIV.

These results were different from the study by Shokoohi where a considerable subgroup has low knowledge of HIV transmission but knew that one can get HIV by using dental instruments used for PLHIV.<sup>10</sup> According to Carter, studies had shown very little transmission through saliva but if there are cuts or abrasions in the oral cavity, HIV/AIDS is most likely.<sup>12</sup> Upon conversation with the participants after they had received their knowledge score, many of them did not take into account more invasive procedures and instead only considered dental examination, i.e., contact of a laryngeal mirror with an intact oral mucosa.

For knowledge regarding HIV prevention, diagnosis and treatment, at least 78% of the respondents got the questions correctly with most (6 out of 10) of the questions garnering 90% and above. This shows that the respondents have high knowledge with regarding HIV prevention, diagnosis and treatment. The Philippines AIDS Prevention and Control Act or Republic Act No. 8504 emphasizes the need for vigorous efforts to promote public awareness of HIV/AIDS, including prevention, through a comprehensive nationwide educational and information campaign, and extension of support and full protection of human

rights and civil liberties to every person with HIV/AIDS.<sup>5</sup> The results maybe the manifestation that the efforts of the law were not vain. However, it should also be noted that majority (66%) of the respondents in this study are college degree holders.

Those who had undergone HIV testing were significantly more likely to have good knowledge regarding HIV/AIDS. This can be attributed to the fact that HIV screening entails pre- and post-testing counselling that may have increased their HIV knowledge. However, a study by Rehal conducted in the Philippines as well as in Kenya, found that few youth seek HIV counselling and testing because there were limited services designed specifically for them.<sup>5</sup>

### *Attitudes*

As seen in Table 3, a majority of the participants have positive attitudes towards HIV/AIDS, in which seven out of 10 statements had at least 90% positive responses. A 2003 Demographic and Health Survey (DHS) showed a positive association between level of education and attitudes towards HIV/AIDS.<sup>5</sup> As all of the participants completed at least secondary education, with most of them having a college degree, it may be argued that education remains to be one of the critical determinants of attitudes towards PLHIV.

Having positive attitudes towards PLHIV have a beneficial impact on the community. A study done locally by de Lind van Wijngaarden revealed that PLHIV with strong support from their family, colleagues and friends have good mental health outcomes. The same study also revealed that having negative attitudes or stigmatization of PLHIV have a poor effect on their health-seeking behavior; high rates of loss to follow up and non-compliance with medications were noted. Overall, having a positive attitude towards PLHIV is beneficial.<sup>14</sup>

Those not in a relationship were significantly more likely to have positive attitudes towards PLHIV and HIV/AIDS. No related study had done this association before.

### *Practices*

With regards to the risky behaviors, a majority of the participants have good practices: 94.9% denied that they had injected illicit or stimulant drugs and 98% denied use of unsterile or shared syringes. However, half (53.1%) of the respondents admitted

that they had sex with someone other than their significant other. This result showed a change in the preference of the youth compared to a decade ago wherein majority of adolescents disapproved of premarital affairs.<sup>6</sup>

Despite having high knowledge on the transmission and prevention of HIV, only 45% of the respondents had regularly used condoms and among those who did not use condoms regularly, 15.4% did not think it was necessary. This result is congruent with a study done among Thai MSM wherein there was a non-significant relationship between perceived benefits of condom use and sexual risk behaviors.<sup>15</sup> Furthermore, this result did not differ with the results of a similar study done in the Philippines five years ago wherein knowledge about HIV prevention was high but consistent condom use was low.<sup>10</sup> While condoms are widely accessible, one third (35.8%) said that condoms were not accessible the last time they had sex. Condom accessibility remains one of the issues concerning the sexual health of Filipinos. A study done in 2003 showed that religion and cultural norms affect the accessibility and usage of condom among adolescents.<sup>6</sup>

Even though a high number of respondents denied injecting illicit drugs, 41.7% of the respondents admitted that they had used alcohol/drugs before sex. Alcohol and drug use are two lifestyle indicators that are known to be highly related with risky sexual behavior.<sup>16</sup> Twenty percent of the PLHIV in the study reported intravenous drug use. It has long been known that injecting drugs, especially with unsterile needles, increase the risk for HIV transmission. However, evidence shows that given adequate information and proper medical rehabilitation, IV drug users were able to move to safer practices such as stopping drug use, or at least more consistently using sterile syringes.<sup>17</sup>

Positive attitudes towards PLHIV have been associated with a willingness to undergo HIV testing.<sup>10</sup> This was seen in this study where good attitude towards PLHIV was observed together with high HIV testing prevalence --- 49.6% underwent HIV testing in the last 12 months and 12.6% had it before the past 12 months.

In the interpretation of these findings, a few limitations should be noted. First, the data are based on self-report and the use of a questionnaire, which may have only evaluated their sexual attitudes and behaviors without further exploration of the motives

and influences behind them. Another potential limitation is the possibility of recall bias, which may have caused some underreporting or overreporting of the respondents' certain practices. The sample was also only limited to Metro Manila. The questionnaire employed in the study was available only in English. Related to this, only subjects who have completed grade school or higher were recruited. These factors may be a source of bias and the results may not be representative of the general population of youth, especially of populations such as out of school youth. Most of the samples were obtained through the online survey; MSM youth who have no access to the internet may be underrepresented. Face-to-face surveys were only done in the vicinity of two gay bars which may have also narrowed certain outcomes. Lastly, although this study tried to reduce concerns regarding the privacy of the participants, some participants may have incorrectly given responses because of the issues regarding perceptions of HIV and social desirability.

The study's population, the community of Filipino male youth having sex with males living in Metro Manila, still continues to engage in risky sexual behavior despite the high knowledge on HIV and this raises a concern on the approach of HIV campaign in the country. The researchers therefore recommend that the nation's awareness campaign includes the repercussions of risky sexual behaviors. In addition, condom accessibility remained a problem in the country and hence, campaigns fighting the stigma on the usage of condom as well as policies that will increase condom usage among the youth would be beneficial in halting the increasing trend of HIV in the Philippines.

## References

1. Perez A, Zablan Z, Pacon C, Galay C, Viejo M. HIV/AIDS situation in the Philippines, n.d.
2. Libang G, Malayang G, Padilla C. Country analysis of AIDS in the Philippines: Gender and age situation and response. Available from: [https://www.unicef.org/philippines/mediacentre\\_19971.html](https://www.unicef.org/philippines/mediacentre_19971.html).
3. Department of Health. HIV/AIDS and ART Registry in the Philippines. 2018 Sep.
4. Mogato M. Philippines has highest HIV infection growth rate in Asia-Pacific: U.N. Thomson Reuters [Internet]. 2017 Aug 1. Available from: <https://www.reuters.com/article/us-health-aids-philippines/philippines-has-highest-hiv-infection-growth-rate-in-asia-pacific-u-n-idUSKBN1AH3CW>.
5. Rehal S. HIV/AIDS prevention for adolescents: Perspectives from the Philippines and Kenya. *Asia-Pacific E-Journal Health Soc Sci* [Internet]. 2012 Jun; 1(1). Available from: [https://www.researchgate.net/publication/282008830\\_HIVAIDS\\_Prevention\\_for\\_Adolescents\\_Perspectives\\_from\\_the\\_Philippines\\_and\\_Kenya](https://www.researchgate.net/publication/282008830_HIVAIDS_Prevention_for_Adolescents_Perspectives_from_the_Philippines_and_Kenya).
6. World Health Organization, and Regional Office for the Western Pacific. *Sexual and reproductive health of adolescents and youths in Philippines: A review of literature and projects 1995-2003*. Manila, Philippines: World Health Organization, Western Pacific Region, 2005.
7. Tanaka Y, Llave, Tuliao MTR, Yamashita T, Matsuo H. Knowledge, behavior and attitudes concerning STI prevention among out-of-school youth in the Philippines [Internet]. *Univers J Public Health*. 2017 May; 5(3): 127–34. Available from: <https://doi.org/10.13189/ujph.2017.050307>.
8. A situation-response analysis of the education sector's response to HIV, drugs and sexual health in the Philippines June 2012. UNESCO, n.d.
9. Philippines implement sexuality education in schools [Internet]. Sexuality Information and Education Council of the United States. Available from: <http://www.siecus.org/index.cfm?fuseaction=Feature.showFeature&featureid=1909&pageid=483>.
10. Shokoohi M, Karamouzian M, Mirzazadeh A, et al. HIV knowledge, attitudes and practices of young people in Iran: Findings of a national population-based survey in 2013 [Internet]. *PLOS ONE* 2016 Sep 14; 11(9): e0161849. Available from: <https://doi.org/10.1371/journal.pone.0161849>.
11. Gangcuangco LMA, Tan ML, Berba RP. Prevalence and risk factors for HIV infection among men having sex with men in Metro Manila, Philippines. *Southeast Asian J Trop Med Public Health* 2013; 44(5): 810–7.
12. Corpuz A, Sunga L, Pulmano R, Lazatin J. Cases of HIV/AIDS in Tarlac Province, Central Luzon, Philippines from 1984 to 2016 and the knowledge and risky behaviors of various gender groups. *Int Rev Hum Sci Res* [Internet]. Available from: [www.irhsr.org/papers/Feb2017-1.pdf](http://www.irhsr.org/papers/Feb2017-1.pdf)
13. Carmona, CE. Dental health care: What it means to PLHIV [Internet]. [Accessed 2018 Sep 23]. Available from: <http://ritm.gov.ph/dental-health-care-what-it-means-to-plhiv/>.
14. De Lind Van Wijngaarden JW, Ching AD, Settle E, Van Griensven F, Cruz RC, Newman PA. 'I am not promiscuous enough!': Exploring the low uptake of HIV testing by gay men and other men who have sex with men in Metro Manila, Philippines [Internet]. *PLOS One* 2018; 13(7). Available from: <https://doi.org/10.1371/journal.pone.0200256>.
15. Khumsaen N, Stephenson R. Beliefs and perception about HIV/AIDS, self-efficacy, and HIV sexual risk behaviors among young Thai men who have sex with men [Internet]. *AIDS Educ Prev*. 2017 [Accessed 2018 Sep 24]; 29(2): 175-90.

16. Ramos-Jimenez P, Lee R. Male sexual risk behavior and HIV/AIDS: A survey in three Philippine cities. [Manila]: Behavioral Sciences Department De La Salle University; 2000.
17. Ball A, Des Jarlais DC, et al. Multi-city study on drug injecting and risk of HIV infection. World Health Organization, Geneva; 1994.
18. Bagherzadeh R, Zahmatkesan N, Rashidi H, Gashmard R, Mirzaei K. Knowledge, attitude, and practice regarding HIV/AIDS transmission and prevention among inmates in Bushehr Prison [Internet]. Jundishapur Health Sci. 2015 Oct. doi: 10.17795/jjhs-30541
19. Philippines, Republic Act No. 8504: Philippine AIDS Prevention and Control Act of 1998, Republic of the Philippines, 1998

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# Association between duration of gadget use and the socio-emotional difficulties of junior high school students in selected private schools in Quezon City: An analytic cross-sectional study

Bianca Mari B. Dizon, Marie Krista Yna D. Dolor, Angelica Jane T. Domalanta, Princess Fe M. Domingo, Jeune Azelia V. Dominguez, Abegail M. Dulay, Vlanche April C. Dulfo, Hazel Monique A. Dumo, Kristel Joyce T. Ebuengan, Danielle Dominique L. Eduardo, Patricia Denise J. Ela, Toni Anne B. Elarmo, Maria Peñafrancia L. Adversario, MD

## Abstract

**Introduction** Gadget use with its diverse range of functions from communication to navigation and entertainment, has brought increasing concerns about its effects on psychological health. Despite growing evidence on its effect among children, its effect on the adolescent age group, particularly on the socio-emotional dimension remains uncertain.

**Method** An analytical cross-sectional study was done to identify a possible association between duration of gadget use and socio-emotional difficulties of an adolescent. A cluster sample of junior high school students aged 13-17 years old from four selected private schools were invited to answer the Strengths and Difficulties Questionnaire (SDQ) to measure socio-emotional difficulties and provide information on the type and duration of gadget use. Scores derived from the SDQ were classified as normal, borderline and abnormal based on the questionnaire's scoring guide. Association between duration of gadget use and strengths and difficulties was tested using chi-square, controlling for sex and age groups.

**Results** Majority of the 315 respondents had normal scores on the strengths and difficulties sub-scales. Regardless of the duration of gadget use, majority of the respondents had normal prosocial behavior and likewise scored normal on all dimensions of the Difficulties subscale. There was no significant association between duration of gadget use and Strength ( $p = 0.47$ ) and Difficulties scores ( $p = 0.35$ ). Stratifying by sex and age groups likewise resulted in insignificant associations ( $p > 0.05$ ). Those with prolonged gadget use were 1.68 times more likely to have abnormal scores on the Difficulties subscale compared with those with normal gadget use but the association was not significant (95% CI 0.82, 3.34).

**Conclusion** There was no significant association between duration of gadget use and socio-emotional difficulties of adolescents in selected private schools, controlling for sex and age groups.

**Keywords:** gadget use, strengths, difficulties

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### Correspondence:

Maria Peñafrancia L. Adversario, Department of Preventive and Community Medicine, College of Medicine, University of the East Ramon Magsaysay Memorial Medical Center Inc., 64 Aurora Boulevard, Barangay Doña Imelda, Quezon City, PH 1113; e-mail: 78penadv86@gmail.com

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Gadget use is now ubiquitous in everyday life, with approximately 2 billion users worldwide. Given the diverse range of functions offered by these pocket-sized gadgets - from communication to navigation and entertainment, their popularity is inevitable. It may make certain aspects of everyday life easier, but increasing concerns exist about the negative effects of their use, especially on psychological health.

Concerns have been raised that children might form "electronic friendships" with the machine

instead of their peers, thus hindering the development of interpersonal skills.<sup>1,2</sup> It has also been shown that a direct relationship exists between smartphone use and depression, anxiety and stress levels, as well as between problematic phone use and psychological disturbance.<sup>1</sup> In addition, the use of TV/DVD or game consoles exceeding 2 hours was found to have significant association with behavioral health problems, particularly conduct problems.<sup>3</sup> Conversely, children aged 10-15 years old who spent less than one hour a day using electronic games had higher life satisfaction and prosocial behavior than those who had used media for more than three hours a day.<sup>4,5</sup>

Despite growing evidence on its effect among children, studies on its effect on the adolescent age group, particularly on the socio-emotional dimension remains scarce. In this light, the researchers hoped to identify a possible association between duration of gadget use in terms of the number of hours of smartphone and/or tablet use daily, and the socio-emotional difficulties experienced by an adolescent using the prosocial subscale and emotional/ conduct/ peer/ hyperactivity subscales of the Strengths and Difficulties Questionnaire. It will substantiate the growing evidence on the deleterious effects of gadget use with focus on its effect on an emerging aspect which is socio-emotional development among a vulnerable subgroup (adolescents). This will therefore help direct priorities of healthcare providers and educators in formulating guidelines on gadget use.

## Methods

A cross-sectional analytic study design was carried out on currently enrolled junior high school students aged 13-17 years old from four selected private high schools in Quezon City. Students who own and use a tablet and/or smartphone for leisure or academic purposes were included.

Four private high schools in Quezon City were selected through non-probability sampling. Classes were considered as clusters and three clusters per grade level were chosen by simple random sampling. All students in the selected clusters were included in the sample. A sample of 746 students was deemed adequate to determine the association between duration of gadget use and prosocial and total difficulties behavior, using the odds ratio as estimate from a study on screen time and behavioral health

problems at 5% level of significance and 80% power.<sup>3</sup>

Duration of gadget use was defined as a self-reported average number of hours of use of smartphones or tablets per day (weekday) for the past year. This was categorized as normal ( $\leq 2$  hr daily) or prolonged ( $> 2$  hr daily). The cut-off value was based on the results of an Oxford University research done among 15-year-olds, that around two hours of smartphone use can have a positive impact on the students and from a cross-sectional study, the PEACH Project, that more than two hours per day of gadget use can be associated with higher psychological difficulty scores.<sup>6</sup>

Socio-emotional difficulties was measured by scores obtained from the Strengths and Difficulties Questionnaire (SDQ), a 25-item questionnaire containing five items per dimension referring to a behavior or emotion. Each item is scored as 1 for somewhat true, and 0 or 2 for not true or certainly true, depending on the way the questions were framed (positive or negative).<sup>7</sup> The scores were categorized as normal, borderline and abnormal from the questionnaire's scoring guide. A total score less than 15 was classified as normal, 16-19 as borderline, and more than 20 as abnormal. The Strength subscale was represented by the dimension on prosocial behavior which refers to a child's ability to be considerate of other people's feelings, share readily with other children, be helpful and kind to others, and often volunteer to help. Scores ranging from 6 to 10 were considered normal, 5 was borderline, 4 or less was considered abnormal.

The Difficulties subscale had the following dimensions: 1) emotional problems - a child's tendency to worry a lot, to have many fears, and to often be unhappy and nervous; a score of 5 or less was considered normal, 6 was borderline, 7 to 10 were considered abnormal; 2) conduct problems - a child's tendency to have temper tantrums, often fight with other children, often lie or cheat, and steal from home, school or elsewhere; a score of 3 or less was considered normal, 4 was borderline, 5 to 10 was considered abnormal; 3) peer problems - a child's tendency to play alone, have few friends, be picked on or bullied, and get on better with adults than with other children; a score of 3 or less was considered normal, 4-5 was borderline, while 6 to 10 was considered abnormal; 4) hyperactivity - a child's tendency to be restless, to constantly fidget, to be easily distracted, and to see tasks through to the end; a score of 5 or less was

considered normal, 6 was borderline, 7 to 10 was considered abnormal.

Permission was sought from participating schools' administration prior to the conduct of the survey. On an agreed schedule, simultaneous distribution of the questionnaires and informed consent/assent forms was carried out in the chosen clusters. Students and class advisers were oriented on the purpose of the study and on the procedure in accomplishing the informed consent/assent forms and filling up of the questionnaire (for students, advisers and parents) during a class period assigned by the school administration. The students were asked to bring the questionnaires home for their parents to read, sign and accomplish. The forms were then collected by the class advisers on an agreed date. Each class adviser was asked to evaluate the students of the sections they handled using the teachers' questionnaire which was collected by the year level coordinator on an agreed date.

Information on sex, age, type of gadget and duration of gadget use and responses on the SDQ was collected from each respondent. Data were encoded in Microsoft Excel and only those with complete and valid entries were considered for analysis. Analysis was carried out using SPSS version 24. Descriptive statistics entailed use of counts and proportions for categorical variables. The association between duration of gadget use and prosocial behavior of the Strengths subscale and dimensions of the Difficulties subscale was determined using Chi square test of association with  $p$ -value  $< 0.05$  as cut-off for significance. To control for the confounding effect of sex and age group on the association between duration of gadget use and strengths and difficulties, stratified analysis was carried out. An odds ratio with 95% confidence interval was generated for the association between duration of gadget use and strengths and difficulties subscale.

The study posed minimal risk to the participants based on the vulnerability of the study population and the sensitivity of the questions asked in the SDQ. A subject's refusal to participate or continue in the research was respected. Information on the study to which the student's participation was sought, and terms such as "research," "study design," "procedures," "adverse effect," "voluntary" were explained in a manner and language the student understood for purposes of assent and dissent. This follows the provisions of the National Ethical

Guidelines for Health and Health-related Research and was approved by the Ethics Review Committee. The privacy and confidentiality of the informed consent process was maintained by ensuring that all signed consent forms were kept in a locked cabinet where only the investigators had the key. Each participant in the study had a code assigned to their name to ensure that their privacy and confidentiality was maintained. Thus, the identity of the participants remained anonymous. Confidentiality of the responses was strictly maintained by following researcher-participant agreement for the collection and protection of research data to ensure the privacy of their data. Participants of this research were respected and viewed not as passive sources of data but as partners in the research process and shall always be viewed as the social equal of the research. No conflicts of interest were present in the study. No incentives were given to the participants.

## Results

A total of 385 questionnaires were retrieved. Of these, 315 had complete data and were subjected to analysis. Majority of the 315 participants belonged to the early adolescent age group (76%), were females (62%), and from Grade 8 (38%) as shown in Table 1. There were more smartphones users than tablet users. Regardless of the type of gadget used, majority used them for less than 2 hours (Table 2). Prolonged use was noted among those in the middle adolescent age group, among females and among those belonging to Grades 9 and 10 (Table 3).

The scores of the students for both the Strengths and Difficulties subscales were classified as normal. Among those classified as normal, the highest proportion came from the hyperactivity/inattention dimension of the Difficulties subscale. Under borderline category, the highest proportion was from the peer problem dimension. In the abnormal category, emotional problem dimension gave the most contribution (Table 4).

Regardless of the duration of gadget use, majority of the respondents had normal prosocial behavior. There was no significant association between duration of gadget use and Strength subscale scores ( $p = 0.47$ ) as shown in Table 5. Likewise, majority of the respondents were normal in each dimension of the Difficulties subscale and overall, irrespective of duration of gadget use. Similarly, no significant

## Association between duration of gadget use and the socio-emotional difficulties of junior high school students

**Table 1.** Demographic profile of respondents.

Characteristics	n (%)
Age groups	
Early adolescent (13 to 14 years old)	239 (76.0)
Mid adolescent (15 to 17 years old)	76 (24.0)
Sex	
Male	121 (38.0)
Female	194 (62.0)
Grade level	
Grade 7	63 (20.0)
Grade 8	121 (38.0)
Grade 9	59 (19.0)
Grade 10	72 (23.0)

**Table 2.** Profile of gadget use by type of gadget and duration of use.

Type of Gadget	Gadget use		Total
	Normal use No. (%) n = 165	Prolonged use No. (%) n = 150	
Tablet	13 (4.0)	11 (3.0)	24
Smartphone	152 (48.0)	139 (44.0)	291

**Table 4.** Strengths and difficulties of junior high school students.

Subscales, n (%)	Normal	Borderline	Abnormal
Strengths subscale			
Prosocial behavior	275 (87.0)	23 (7.0)	17 (5.0)
Difficulties subscales			
Emotional problems	215 (68.0)	25 (8.0)	75 (24.0)
Conduct problems	255 (81.0)	36 (11.0)	24 (8.0)
Hyperactivity/inattention	274 (87.0)	27 (9.0)	14 (4.0)
Peer problems	211 (67.0)	79 (25.0)	25 (8.0)
Overall difficulties	209 (66.0)	70 (22.0)	36 (11.0)

**Table 5.** Association between duration of gadget use and strength subscale.

Gadget use	Strength subscale, n (%)			Total	p-value*
	Normal	Borderline	Abnormal		
Normal use	144 (87.3)	14 (8.5)	7 (4.2)	165	0.468
Prolonged use	131 (87.3)	9 (6.0)	10 (6.7)	150	

\*Chi-square test

association was found between duration of gadget use and Difficulties subscale scores ( $p > 0.05$ ) as shown in Table 6.

Stratifying by sex, there was no significant association between duration of gadget use with Strength and Difficulties subscale scores ( $p > 0.05$ ) among males and females (Tables 7 & 8, re-spectively). Also, by subgroups of age, there was no significant association between duration of gadget use with Strength and Difficulties subscale scores

**Table 3.** Duration of gadget use by demographic characteristics.

Variable	Gadget use, n (%)	
	Normal use	Prolonged use
Age group		
Early adolescent	138 (44.0)	101 (32.0)
Middle adolescent	27 (9.0)	49 (16.0)
Sex		
Male	79 (25.0)	42 (13.0)
Female	86 (27.0)	108 (34.0)
Grade level		
Grade 7	39 (12.0)	24 (8.0)
Grade 8	72 (23.0)	49 (16.0)
Grade 9	27 (9.0)	32 (10.0)
Grade 10	27 (9.0)	45 (14.0)

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Association between duration of gadget use and the socio-emotional difficulties of junior high school students

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**Table 6.** Association between duration of gadget use and difficulties subscale, n (%).

		Emotional problems			Total	p-value*
Gadget use		Normal	Borderline	Abnormal		
Normal use		120 (72.7)	11 (6.7)	34 (20.6)	165	0.201
Prolonged use		95 (63.3)	14 (9.3)	41 (27.3)	150	
		Conduct problems				
Normal use		135 (81.8)	16 (9.7)	14 (8.5)	165	0.527
Prolonged use		120 (80.0)	20 (13.3)	10 (6.7)	150	
		Hyperactivity/inattention				
Normal use		148 (89.7)	11 (6.7)	6 (3.6)	165	0.322
Prolonged use		126 (84.0)	16 (10.7)	8 (5.3)	150	
		Peer relationship problems				
Normal use		113 (68.5)	37 (22.4)	15 (9.1)	165	0.433
Prolonged use		98 (65.3)	42 (28.0)	10 (6.7)	150	
		Overall difficulties				
Normal use		114 (69.1)	36 (21.8)	15 (9.1)	165	0.354
Prolonged use		95 (63.3)	34 (22.7)	21 (14.0)	150	

\* Chi-square test

**Table 7.** Association between duration of use and strength subscale stratified by sex.

Sex	Gadget use	Strength subscale, n (%)			Total	p-value*
Males	Normal use	70 (88.6)	6 (7.6)	3 (3.8)	79	0.069
	Prolonged use	31 (73.8)	5 (11.9)	6 (14.3)	42	
Females	Normal use	74 (86.0)	8 (9.3)	4 (4.7)	86	0.252
	Prolonged use	100 (92.6)	4 (3.7)	4 (3.7)	108	

\*Chi-square test

**Table 8.** Association between duration of use and difficulties subscale stratified by sex.

Sex	Gadget use	Difficulties subscale, n (%)			Total	p-value*
Males	Normal use	57 (72.2)	18 (22.8)	4 (5.1)	79	0.186
	Prolonged use	24 (57.1)	13 (31.0)	5 (11.9)	42	
Females	Normal use	57 (66.3)	18 (20.9)	11 (12.8)	86	0.907
	Prolonged use	71 (65.7)	21 (19.4)	16 (14.8)	108	

\*Chi-square test

( $p > 0.05$ ) among early and middle adolescent age groups (Tables 9 & 10, respectively).

Students with prolonged gadget use were 1.48 times more likely to fall in the abnormal category than borderline on the Difficulties subscale. Likewise, students with prolonged gadget use were 1.68 times more likely to fall in the abnormal category than normal on the Difficulties subscale. Those with prolonged gadget use were 1.13 times more likely to fall in the borderline category than normal on Difficulties subscale. However, the association was not significant since the 95% confidence intervals of the estimate included the null value of 1.0 (Table 11).

### Discussion

Study findings reveal no significant association between duration of gadget use and socio-emotional difficulties of the adolescent in the sample while keeping sex and age groups constant.

The definition for prolonged use of more than two hours could have been too short to have caused a significant effect on the dimensions of the Strength and Difficulties subscale scores. In Tandeo's study in 2015 among Asia Pacific countries, Filipinos spent a high amount of time online, averaging more than 6 hours per day, compared to citizens of neighboring countries. The average number of hours spent on

**Table 9.** Association between duration of use and strength subscale stratified by age group.

Age group	Gadget use	Strength subscale, n (%)			Total	p-value*
Early adolescence (13 to 14 yr)	Normal use	119 (86.2)	12 (8.7)	7 (5.0)	138	0.282
	Prolonged use	85 (84.2)	6 (5.9)	10 (9.9)	101	
Mid adolescence (15 to 17 yr)	Normal use	25 (92.6)	2 (7.4)	0 (0.0)	27	0.829
	Prolonged use	46 (93.9)	3 (6.1)	0 (0.0)	49	

\*Chi-square test

**Table 10.** Association between duration of use and difficulties subscale stratified by age group.

Age group	Gadget use	Difficulties subscale, n (%)			Total	p-value*
Early adolescence (13 to 14 yr)	Normal use	96 (69.6)	32 (23.2)	10 (7.2)	138	0.223
	Prolonged use	63 (62.4)	24 (23.8)	14 (13.9)	101	
Mid adolescence (15 to 17 yr)	Normal use	18 (66.7)	4 (24.4)	5 (18.5)	27	0.779
	Prolonged use	32 (65.0)	10 (20.4)	7 (14.3)	49	

\*Chi-square test

**Table 11.** Measure of association between duration of gadget use and difficulties subscale.

Gadget use	Difficulties subscale		Total	OR	95% CI
	Abnormal	Borderline			
Prolonged	21	34	55	1.48	0.66, 3.34
Normal	15	36	51		
Prolonged	Abnormal	Normal	116	1.68	0.82, 3.44
	Normal	15			
Prolonged	Borderline	Normal	129	1.13	0.66, 1.95
	Normal	36			

gadget use still fell within the average duration of use of Filipinos.<sup>2</sup>

Socio-emotional development also depends on several factors aside from exposure to gadgets. Twin studies of children's prosocial behavior have shown that both genetic and environmental factors do contribute to individual differences in prosocial behavior. Regardless of the time spent by the junior high school students on gadgets, it is possible that parenting, temperament and genetics have greater impact on prosocial behavior development compared to time spent on gadgets.<sup>8</sup>

Also, participants may be using their gadgets in a way that does not negatively affect their behavior. Boumosleh and Jaalouk's study showed that gadgets were used mainly for communication through texting and calling family members or friends. These functions of gadget use could not have contributed negatively to the junior high school students' prosocial behavior.<sup>9</sup> The researchers were not able to take into account the reason of gadget use whether it be for academic purposes or for leisure as well as other more factors that may have a consequence on socio-emotional difficulties.

The number of participants recruited was not enough to meet the computed sample size. There was a non-response greater than 20% of the target population, thereby resulting to a non-response bias.

## References

1. Langan K. The relationship between smartphone use and the development of mental health issues [dissertation]. [Dublin]: DBS School of Arts, Dublin; 2006.
2. Tandeo H. Philippine telecoms - almost ripe for digital. Report. Manila: CLSA, 2015.
3. Ilamparithi P, Selvakumar P. Association between screen time and behavioural health problems among urban and rural students in early and mid-adolescent age group. *J Pediatr Res* [Internet]. 2017; 4(07): 453-60. doi:10.17511/ijpr.2017.07.04
4. Przybylski AK, Weinstein N. Can you connect with me now? How the presence of mobile communication technology influences face-to-face conversation quality. *J Soc Pers Relat* 2012; 30(3): 237-46.
5. Limtrakul N, Louthrenoo O, Narkpongphun A, Boonchooduang N, Chonchaiya W. Media use and psychosocial adjustment in children and adolescents. *J Paediatr Child Health* [Internet]. 2018 Mar; 54(3): 296-301. doi: 1111/jpc.13725
6. Page AS, Cooper AR, Griew PJ, Jago RP. Children's screen viewing is related to psychological difficulties irrespective of physical activity. *Pediatrics*. 2010 Nov; 126(5): e1011-e1017
7. Strength and Difficulties Questionnaire [Internet] [modified 2017 Jun 16]. Available from: <https://sdqinfo.org/py/sdqinfo/b0.py>
8. Flynn J. The effect of mobile phone attachment on an attention task among secondary school and college students [dissertation]. [Dublin]: DBS School of Arts; 2014.
9. Boumosleh JM, Jaalouk D. Depression, anxiety and smartphone addiction in university students - a cross sectional study. *PLoS ONE* [Internet] 2017; 12(8): e0182239. Available from: <http://doi.org/10.1371/journal.pone.018223>

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# Experiences and perceptions of former medical students on the neurology curriculum: A reminiscing focus group discussion

Amado M. San Luis, MD, MSPH<sup>1</sup>; Cely D. Magpantay, PhD<sup>2</sup> and Jose D. Quebral, MD<sup>3</sup>

## Abstract

**Introduction** The objective of this focus group discussion was to explore the experiences and perceptions of former medical students with the undergraduate neurology curriculum.

**Methods** Perceptual patterns were derived from transcriptions of the discussion of the participants in a focus group discussion involving faculty, residents and postgraduate interns. Data were analyzed using latent content analysis and constant comparison techniques.

**Results** Shared experiences in clinical clerkship were mostly negative. The difficult initial patient encounters were suggested to be minimized through hierarchal modeling, modification of the subject contents and early clinical exposures. An environment created to be conducive to learning and neuroscience subjects suited for the primary physician will equip the medical graduates better. The perceived pressures forced the participants to find ways to cope. Neuroanatomy helped much in the clinics. The group suggested more clinical correlates and the use of drawings to aid the graduates attain the competency in neurology for a primary physician.

**Conclusion** The participants' experiences were largely negative and were brought about by a varied form of pressures. Contributing factors were identified and suggestions to improve learning and retention were given.

**Keywords:** Neuroscience, residents, postgraduate interns

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### Correspondence:

Amado M. San Luis, MD, MSPH, Department of Clinical Neurosciences, University of the East Ramon Magsaysay Memorial Medical Center Inc., 64 Aurora Boulevard, Barangay Doña Imelda, Quezon City, PH 1113; e-mail: amadoslmd@gmail.com

<sup>1</sup> Department of Clinical Neurosciences, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

<sup>2</sup> College of Nursing, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

<sup>3</sup> Research Institute for Health Sciences, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

Subjects in the Neurosciences are well covered in the UERMMMC medical undergraduate curriculum. The faculty of the Department of Clinical Neurosciences created strategies that would equip students with the ability to recognize and treat common neurological diseases as primary physicians. The strategy is to provide each year level with neuroscience subjects to ensure continuity in the acquisition and application of knowledge. These subjects are Neuroanatomy in Level I; Introduction to Clinical Neurology and Localization in Level II; Symptoms and Common Neurological Diseases in Level III; one-month rotation in Neurology and Neurosurgery in Level IV (clinical clerkship).

The Office of the Dean of the College of Medicine designed outcome measures that audit the faculty and curriculum. These measures are faculty evaluation by the students and faculty evaluation of the curriculum in Levels I to III. The faculty and curriculum were consistently graded as “very satisfactory” or “excellent”. These impressive audits, however, do not seem to translate in the written examinations where 60% of students fall below predetermined passing level. The performance of students in Level IV is measured through written examinations and an objective structured clinical examination (OSCE) but was never validated as a measure of clinical competence in neurology. To appropriately conclude that the undergraduate neurology program has succeeded in attaining the primary objective, the student’s point of view will have to be determined. Students, in general, are very satisfied with faculty performance, but it is not known if they have assimilated what was taught sufficiently to prepare them for clinical neurology. There is, therefore, a need to probe the experiences and perceptions of medical students regarding the undergraduate neuroscience curriculum. The objective of this focus group discussion was to explore the experiences and perceptions of former medical students on the undergraduate neurology curriculum.

## Methods

The researchers used a qualitative content analysis design. Perceptual patterns were derived from the transcriptions of the discussion of the participants in a focus group discussion (FGD). Faculty consultants, residents and postgraduate interns identified through purposive sampling were invited through a letter explaining the general purpose. At the start, the investigator (AMS) explained the activity and its objective; this was followed by introductions and some guidelines (JDQ). The facilitator (JDQ) then had the group answer each of the trigger questions previously provided by the primary investigator. He asked follow-up and probing questions as the situation required. Each participant was given time to recount his/her experiences and express his/her views. Discussion of each question proceeded until ideas and topics were redundant.

The FGD was conducted in a departmental conference room with a round-table set up where all the participants faced each other. The qualitative study analyst (CDM) was present but did not participate

in the discussions. A digital audio recording of the discussion was done with the consent of all the participants. The primary investigator and qualitative study analyst took notes of the proceedings. The FGD lasted an hour and a half.

The trigger questions were as follows: 1) What were your experiences when faced with a neurological case in the clinical setting?, 2) What were the reasons for the difficulty or ease?, 3) Which of the specific neuroscience subjects were the most difficult or the easiest from your view-point as a student then?, 4) What factors contributed to the difficulty or ease based on your experience?, 5) What are your proposals to enhance the learning of these difficult subjects and use this acquired knowledge in the clinical setting?

Audio recordings of the interviews were transcribed, summarized and analyzed by the main author (AMS), the facilitator (JDQ) and an independent expert in qualitative studies (CDM). Data were analyzed using latent content analysis and constant comparison techniques.<sup>1-6</sup> The transcribed interviews were coded repeatedly by the team (AMS, CDM) by an open coding approach. A word or phrase that captured the meaning within a section of the text was written on the margin of the transcripts. Memos were written and underlined. The entire transcribed discussions were studied and coded separately at first and repeatedly until saturation. Memoing was included when they occurred during coding. Then codes from each interview were compared by constant comparison. Ideas frequently mentioned noted at the end of the comparison method were temporarily labeled as main themes. These main themes were then compared with the other codes and if found to be consistently related to the theme, they were labeled sub-themes. Themes emerging from spontaneous responses were then grouped into categories. All categories, themes, and sub-themes were then sorted to determine their relationships with each other. Independent analysis of data from an experienced qualitative study analyst (CDM) and the primary author’s (AMS) data were discussed and derived constructs were agreed on. Operational definitions were then written for all major categories that evolved and themes and sub-themes that emerged.

## Results

The FGD had seven participants comprised of two faculty, three residents and two postgraduate interns.

Both faculty and two of the residents were non-neurologists. More than half of them were less than 30 years old and had graduated from medical school less than 10 years ago. Three of the participants did not graduate from UERMMMCI. Table 1 shows the demographic characteristics of the respondents.

The responses of the participants and derivation of meanings are grouped into headings, categories, themes, and sub-themes after analysis of all data and are presented below for each question.

**Question 1:** How would you describe your experience with the first neurological patient assigned to you?

The responses to the first question were summarized into five headings: shared/similar experiences in clinical clerkship (mostly negative), factors contributing to the negative experiences, positive perceptions, areas of difficulty, and coping.

**I. Shared/similar negative experiences in the clinical clerkship**

A. Negative terms used to describe their first encounter/experience with a neurological patient:

1. *Difficult* - when trying to understand the approach to an actual patient. The participants said that reasons included their self-impressions (“we were clerks at that time”) and of the patient’s condition (“most of the patients were already in their chronic and morbid states”).
2. *Challenging* - when applying the acquired skills to an actual case.
3. *Dreadful* – this was a perception shared with classmates and postgraduate interns. The reasons for this included physical fatigue (“frequent monitoring”, “never get rest”), the fatalistic perception of

neurological patients, and intimidating presence of neurology doctors (“relieved that I did not encounter Dr. ...”)

4. *Uncertain* - when unsure if the neurologic exam was done correctly or not.
5. *Pressured* - from perceived high expectations during neurology rotations, anticipated wrong answers during consultant rounds, and addressing patient-family needs. One participant mentioned that when having his internship in another hospital, the resident instructed him to perform a neurologic examination on a patient since he was a UERM graduate. Another cited a time when she had to take a quick history from the hysterical mother of a child who was seizing.
6. *Confusing* - when attempting to apply knowledge and skills in a patient with multiple problems and co-morbidities.

The negative experiences were described by the terms, “difficult,” “confusing,” “uncertain,” “pressured,” “challenging,” “confusing” and “dreadful.” This negative perception may have been influenced by the physical demands of their duties because of frequent monitoring and other tasks; low self-confidence as clinical clerks; setting high expectations to do well especially during rounds with intimidating doctors; fatalistic perception of neurological diseases; difficulty applying acquired knowledge and skills in patients with multiple co-morbidities; and when two or more clinical situations need urgent attention. These struggles will have to be explored further to affirm their meaning.

**II. The factors that the group believed contributed to the negative experiences** were as follows: fatalistic

**Table 1.** Characteristics of participants in FGD.

Sex, age range (yr)	Time from graduation (yr)	Medical school	Current status	Neurology experience
F, 41-50	> 10	UERM	Faculty, basic science	Level I-IV
M, > 50	> 10	UERM	Faculty, clinical	Level I-IV
F, < 30	< 5	UERM	Post graduate intern	Level I-IV
F, < 30	< 5	Non-UERM	Non-neurology resident	Level I-IV
M, < 30	5-10	Non-UERM	Non-neurology resident	Level I-IV
M, 31-40	5-10	Non-UERM	Neurology resident	Level I-IV
M, < 30	< 5	UERM	Post graduate intern	Level I-IV

impressions, non-clinical related distractions, the limited time allotted for neurology in the undergraduate years, limited teaching models, and the unfavorable milieu of the clinical rotation.

- A. *Fatalistic impressions of neurological cases* running in the minds of medical students in their first encounter with neurological patients. Participants explained this as due to the chronic and morbid conditions of patients, difficulties encountered in patients with co-morbidities, and the state of intubated comatose patients who could not be assessed.
- B. *Distracting factors not related to the management of neurological cases* but impacted on the efforts to apply neurological knowledge and skills. These included the lack or absence of diagnostic tools and fatigue from the physical demands of duties.
- C. *Different time allotted for clinical neurology in the undergraduate years* varied among the participants who came from different schools with different undergraduate neurology curricula. Some participants admitted that limited exposure to neuroscience subjects during their undergraduate years impacted on their ability to manage neurological patients.
- D. Different teaching models are the way neurology is being taught and was briefly mentioned but did not elicit discussions as the majority were unfamiliar with the different models.
- E. *The milieu in the clinical rotation* where neurological patients were first seen influenced their experience because of varied expectations. The participants shared that in the Neurology Ward, “all the people are comatose. When you go there, the place looks like all people are dying” compared with the Neurology Outpatient Clinic where “the first experience was more of teaching rounds.” The experiences in the Medical Ward and Intensive Care Unit were likewise the same.

There were factors that seemed irrelevant to clinical management but impacted on the negative experiences in the first encounter with neurological patients. The physical condition of neurological patients appeared to have triggered a fatalistic impression of neurological diseases that were described as chronic, morbid, intubated with co-morbidities, or dying. Lack

of readily available diagnostic tests and physical fatigue from duties, though not directly related to their ability to apply basic knowledge and skills in clinical neurology, caused frustration among the participants at that time. The length of exposure to the neurosciences in the undergraduate curriculum was considered as an important factor in the ability of the student to adjust when taking care of a neurological patient for the first time. Continuous clinical exposure to basic neurology at all levels allowed some of the students to cope faster during neurology rotation in clinical clerkship. The department rotations where first exposure to a neurological case happened contributed to the experience. Neurology ward and ICU rotations presented a dreadful and demanding setting while the outpatient and medical ward rotation provided more leeway to study the cases with less pressure.

### III. *Positive perceptions*

- A. Few participants had positive experiences in the initial encounter with neurological cases. The terms used were, “*proud, inspired and confident.*” These were experienced after affirmation of the correctness of their decisions or neurological findings, recognition in another institution, and when taught by consultants.
- B. *Factors impacting on the participants’ positive experience* include being able to recognize neurologic problems and make decisions independently, the recognition that the graduate came from a medical school with a good undergraduate neurology curriculum, and mentoring by the consultants.

The initial negative experiences might have been brief and temporary and then shifted to being “proud and inspired” especially when the participants were given positive recognition for their efforts and when taught more often. These were further enhanced when encouraged to make independent diagnosis and decisions which were then affirmed to be correct. Somehow, the recognition of the institution as having a good undergraduate neurology program reflected on the students who in turn felt proud.

IV. *Areas of difficulties* were specific problems that participants recalled as the following: *clinical correlation with diagnosis, critical decision making in the absence of diagnostic support* (“...challenge in

neurology is to make a decision at the right time and not to wait for the diagnostics”), *history taking in an environment where two or more situations needed immediate attention* (“...most distressing part was history taking while the child was seizing and at the same time the mother was hysterical!”), *quickly recalling knowledge and skills, performing and interpreting a neurological examination, and evaluating intubated and comatose patients.*

Remembering neurological knowledge and skills and executing and interpreting neurological examinations were the most common difficulties. History taking was challenging when the patient was intubated or unconscious or in a clinical situation where two or more problems needed immediate attention. Correlating clinical findings with the diagnosis was also an important aspect that needed to be hurdled during the first encounter with a neurological patient. All of these were compounded by a setting where urgent critical decisions are to be made in the absence of vital diagnostic tools.

V. **Coping** were adjustments made by medical students to catch up, recall, understand and apply information to actual patient care in the shortest possible time. The coping mechanisms included *reviewing past notes, reading easy to understand books, repetitions, recalling a consultant’s lessons, and developing one’s interest and own initiative.*

To overcome the difficulties experienced during the first encounter, the students on their own, reviewed transcriptions on the subject and used quick and short reference books, frequently repeated neurological examinations, and recalled demonstrations and lectures by consultants. Interest and personal initiative were likewise given importance.

**Question 2:** What do you think could have been done to minimize the difficult encounter with a neurological patient?

The participants mentioned hierarchal modeling, the method and content of teaching, pre-clinical exposure, student initiative and the enhanced use of learning tools.

I. **Hierarchal modeling** was described as extracting various degrees of knowledge and skills based on perceived competence in the academic

hierarchy from the level of fellow clinical clerks to postgraduate interns to residents and consultants. The *residents were seen as a source of affirmation that the neurologic examination was performed properly. The consultants were perceived as a source of clinical and theoretical correlation, wisdom, experience and inspiration.*

II. **Method and content of teaching** were elaborated by participants who voiced strong concern about the content of what is being taught in the clinics and emphasized *appropriate demeanor of teachers or a collegial environment to enhance learning.* The participants noted that different consultants and residents had their own methods of examining patients; they suggested that students be taught a *standardized way of doing a neurologic examination.* They also manifested that consultants should be approachable, act as a coach, ask questions and give assignments that were subsequently discussed, avoid demeaning remarks to students, *encourage student participation in localizing lesions and encourage students who do well to go into Neurology.*

III. **Pre-clinical exposure** was suggested and elaborated as *early and gradual clinical exposure at all levels; longer neurology rotation; and the student-centered discussion, will help overcome the difficult transition.* The participants said that clinicopathologic correlation after a neuroanatomy lecture was helpful.

IV. The need for the **student’s own initiative** was acknowledged by the participants as very important, like frequent practice, repetitions and self-learning.

V. To **enhance learning varied teaching tools** should be utilized by faculty and consultants in neuroanatomy and localization. Specifically mentioned were drawing (rather than a PowerPoint slide) and videos.

The participants extracted help in ways that recognized hierarchal academic capabilities. They discussed among themselves and asked help from the postgraduate interns who served as sources of information. They looked up to residents for affirmation of their history and neurological examination findings and diagnosis. The consultants

were seen to have the experience, wisdom, clinical eye and be a source of inspiration or ideal model. They also expected consultants to enlighten and guide them in clinical correlation, treatment and decision making. The participants preferred a certain degree of uniformity in the technique of examination and gave strong importance to the consultant's demeanor as one who is approachable and will not make students feel inferior. They suggested different methodologies that enhanced their learning, like coaching patiently to encourage discussion, participation and self-help. Some found being invited to the neurosciences as encouraging. Participants were overwhelmed by the urgent demands to conduct a neurological evaluation and plan management of an uncooperative patient and emotional relatives. They suggested gradual exposure to the wards by exposing them to patients with neurological deficits at the Neurology Out Patient Clinic before medical clerkship. Aside from a longer rotation in neurology, the clinicopathologic correlation at Level I was well remembered and they wished to have more. Some participants preferred that they themselves made efforts to localize lesions and discuss cases. They acknowledged that self-learning, developing interest, practice and repetition helped them. Drawing impacted on most participants well so that they even use the technique in explaining to patients their neurological problems. Some discussants shared that they were awed by consultants who drew and they understood better because they claimed that the visual experience provided them enough time to digest information compared to slides. They also proposed using videos of the neurologic examination of normal subjects and patients with various abnormalities, including comatose patients.

**Question 3:** What do you think could be done in the teaching of neurology to better equip the medical students as primary physicians?

To this question, the participants mentioned things that could be done during clerkship rotation. They also suggested changes in the contents of teaching rounds.

I. **Clinical clerkship** - They emphasized the importance of an *environment conducive to learning during bedside rounds and that the residents and consultants take into consideration fatigue from duties and from monitoring patients at the neurology ward*. The participants also expressed that additional rounds by consultants/residents who are approachable will be helpful.

II. **Emphasis on teaching** – The content of teaching rounds should include the importance of making *a clinical diagnosis and not be dependent on technology*, the teaching of essentials with an *emphasis on more frequently encountered conditions*, repeating or *reviewing lectures given in the lower year levels* and reviewing pathways and checklists. The participants again asserted that *teaching should not be punitive, imposing and strict but encouraging, participatory and collegial*.

The participants responded to the question by focusing on Level IV (clinical clerkship rotation in Neurology). They suggested more frequent resident and consultant rounds with emphasis on discussing the case. To achieve the latter, the hospital should consider hiring more dedicated approachable residents and consultants, schedule predictable rounds, addressing the fatigue factors (which was not shared by the older participants). Most of the discussants want teaching to be limited to commonly encountered diseases in general practice and that the discussions should be clinical-based rather than technology-based diagnosis. The recent utilization of clinical pathways was criticized by a participant to cause students not to think anymore. Emerging strongly was to avoid imposing and strict punitive teaching which needed to be explored further because this came out also as a concern in the earlier part of the discussion.

**Question 4:** How did varied pressures impact on learning and on feelings? Do you feel they were necessary?

The FGD participants found ways of tolerating the experience; many harbored ill feelings; they coped, and gave suggestions.

I. **Tolerating** Most of the participants found ways of tolerating the experience and gave reasons as having *no choice, rationalize that not all consultants were intimidating* as some were inspiring, appreciating the strict training many years after graduating, *not taking it personally, or accepting it as part of the training*.

II. **Ill feelings** Some participants who may have tolerated intimidation during teaching rounds revealed *various degrees of resentment, fears or negative feelings*. They gave reasons such as they were forced to study, or flustered despite conscientious

preparation for rounds, or made to feel inadequate or dumb. One said, "...I will retaliate, but changed my mind because it was a bad experience." Another participant said that consultants and residents who felt treated badly and those did good will be remembered.

- III. **Coping** Participants coped with the pressures by *mentally and physically preparing themselves* based on the endorsements received from batchmates who rotated ahead of them or from friends from previous batches, or they *simply found ways of avoiding* particular residents or consultants and when needed, chose others who in their perception were nice and they would learn much.
- IV. **Preferences** When asked about what they meant by pressure and whom to avoid, they referred to those who made them feel embarrassed or insulted. They *preferred those in the "middle" or consultants and residents who gave them many but meaningful tasks*. These particular residents or doctors are referred to as "toxic but who teach a lot".

Intimidation was tolerated and rationalized in so many ways but nevertheless caused resentment and harbored ill feelings and worst, a possible cycle of reprisal against future students. Coping consisted of avoidance of personalities and mental conditioning that tolerated the situation. When asked to elaborate on what they meant by the pressure they disliked, the participants referred to those who insulted, degraded and caused ill feeling. They preferred pressure from meaningful tasks associated with much learning.

**Question 5:** What were your experiences in Neuroanatomy and its relevance to the clinics?

**Affirmation** - They all agreed that *Neuroanatomy is very relevant* because it prepared them for the clinics and helped localize lesions. They *liked the clinicopathologic conference* at the end of the neuroanatomy course.

**Question 5a:** What did you encounter in Neuroanatomy as difficult? What did you do about it?

- I. Participants found *tracts and circuits difficult to understand and memorize*, particularly the thalamus and hypothalamic structures. The time allotted for the complex and the simpler but more important

topics was the same. The *time gap between Neuroanatomy and the clinical exposure* was too long so that neuroanatomic and physiologic correlation was difficult even if there was already a diagnosis. The *absence of clinical correlation in Neuroanatomy* made the subject difficult to appreciate.

- II. To cope, participants facilitated comprehension and recall with efforts to *"see and feel," the clinical correlation of the tracts* and were practiced by *raising interest on the subject*. The use of tangible plastic brain models or making a gross brain specimen available for dissection also helped understand and remember anatomic structures. *Drawing the figures and tracts* repeatedly enhanced recall and understanding. *Creating theoretical lesions* and correlating with signs and symptoms, then *going back to references* which could be notes, books and easy to read references were some of the coping mechanisms done by students.

**Question 5b:** How do we bridge the gap?

The participants suggested identifying and separating the relevant from the non-relevant topics, and for complex tracts and structures, emphasize only what is most important in the clinic.

- A. To *categorize and separate relevant from non-relevant subjects*, participants suggested choosing topics important to the academe/research versus those applicable to the future needs of the primary physician and then simplifying those topics. They suggested identifying "must know" topics for primary physicians and "nice to know" topics that would be more useful for those who intend to take up Neurology. (One said, "Why did I even memorize these when I never experienced and did not see their relevance in the wards?") The group also *recommended selecting structures that needed memorizing for core competencies and learning the structures relevant in emergency neurological conditions*.
- B. *Only simple and applicable tracts and circuits* should be emphasized for a complex system. The example given for a complex system was the detailed anatomy of the thalamus.

The difficulty experienced in Neuroanatomy was largely on the emphasis to learn and memorize tracts,

including the complex thalamic and hypothalamic circuit. The absence of clinical correlation and the long gap from Neuroanatomy to seeing actual patients added up to the challenging experience. To overcome this challenge, students resorted to raising interest on the subject especially the tracts and studying them through plastic and gross brain specimen models. Drawing the figures and tracts repeatedly to facilitate understanding and recall, was a common suggestion shared by the group. They also created theoretical lesions in the CNS and correlated them with varied references. Some suggested identifying and separating subjects for specialists and for primary physicians. The more complex structures should be simplified to what is more relevant, like the ventroposterolateral nucleus for the sensory portion but the other nuclei group may not be clinically relevant.

**Question 6:** If you were to design the undergraduate curriculum in Neurology, what do you think needs to be done to help a graduate be a competent primary physician?

The group identified case correlates and drawings as important measures or strategies to help students learn Neurology.

- I. **Case correlates** – these must be *about the most common neurological conditions* to reinforce what is being taught in the second and third-year levels. *Facilitators should be conscious that they are teaching future primary physicians.* The selected cases should emphasize the localization of the lesion and its correlation with the patient's clinical manifestations.
- II. **Drawing** – “drawing it to know it,” helped in the understanding and recall, especially when frequently repeated. They noted that “*The time it takes them to draw is the time one assimilates.*” The drawing is experiential as one sees the tract being traced and can be pictured better, whereas a PowerPoint slide is seen for a few seconds only. The drawing may also be a tool used when explaining to patients.

Early clinical correlation and reinforcement at all levels with the content of the curriculum skewed towards preparation for general practice was the most common suggestion. Diagnoses were often arrived at without understanding the disease manifestation, therefore emphasis should be localization and

clinical correlation. Majority of the participants have experienced using drawing as an important tool in understanding and remembering anatomic structures and in explaining to patients.

## Discussion

This qualitative study is grounded on exploring the former medical students' experiences and perceptions of Neurology,

The various words that describe the negative experiences of the participants picture the struggle that medical student undergoes in the neurology curriculum. This difficulty is termed “neurophobia,” a fear of the neural sciences and clinical neurology that is due to the students' inability to apply their knowledge of basic sciences to clinical situations.<sup>7</sup> Neurophobia is common and has a high prevalence of 47.5% in a Singapore study and even extends to residents and generalists.<sup>8-10</sup> There are many possible causes in this study that perhaps contributed directly or indirectly to the negative experiences of medical students, many of which find similarities with other reports.<sup>11</sup> There are however some differences peculiar to countries and medical schools.<sup>10</sup> In this study, the differences in the teaching models do not find plurality in the discussion but still need to be ascertained. Medical students cope with the difficulty by applying the skills of history taking and neurological examination learned in the lower levels. The students supplement this with repetitions, readings, use of easy references, creating their own initiative, and finding interest in clinical neurology. These positive coping experiences create an avenue for enhancing intervention strategies.

The problems that medical students experience appear in the Levels I and IV of the neurology curriculum. These are difficulties remembering and understanding complex connections like the hypothalamus and thalamus and correlating neuroanatomic structures to functions learned at Level I and then bridging this basic neuroscience knowledge with actual encounters with neurological patients at Level IV. Studies show that these are common areas of difficulties.<sup>9</sup> However, in the present study, participants mention specific difficulties in Neuroanatomy and even question the relevance of some topics to clinical practice. This brings to mind the provocative question, how much neurology should a medical student learn and how appropriate is the metaphor, “most people

learn to drive safely with limited knowledge of how the engine works.”<sup>12-14</sup>

The difficulty in Level I regarding neuroanatomic-clinical correlation is perhaps because of the limited exposure to this type of exercise in neuroanatomy. This difficulty perhaps is the reason for the participants to suggest early clinical correlation as described in the recent studies by Nigel.<sup>16</sup> The demand of critically ill neurological patients, where diagnostic tools like MRI or CT scan are not readily available is a common reality in many low and middle-income countries and add distress to young medical minds that still have to cope with simple neurological cases. Non-clinical pressures like fatigue from duties and other physical tasks add to the difficulty but these do not appear as important factors in some studies.<sup>8,17</sup>

One of the factors that may contribute to the negative experiences is described as “pressures in the clinics,” which is a plaintive encounter by the students with doctors during rounds. The pressure experienced in the encounter has two meanings to the respondents: tolerable if coupled with meaningful tasks and more bedside teachings, and strict, punitive and intimidating teaching that resulted in the student harboring ill feelings towards his consultant. Exploring further the meaning of the above experiences is very important because this information is not consistent with the excellent students’ evaluation of the faculty in Levels I to III. There is a strong possibility that this experience occurs at Level IV. Disrespectful and intimidating mentoring lowers the quality of education and is one of the contributors to neurophobia.<sup>11,18</sup>

The participants describe the use of hierarchal mentoring where medical students learn among themselves and from postgraduate interns. Neurology residents who are seen as a source of learning neurological examination and localization may be allowed to teach these topics. This will provide more time for consultants to teach diagnosis, clinical correlation, and treatment. Residents should undergo training in small group teaching. Medical students see neurology consultants as a source of inspiration, wisdom from their experience and guide in the approach to complex problems. Conducting bedside teaching rounds is a common suggestion in several studies.<sup>11,18</sup> Participants strongly suggest directing the goals of teaching for the generalist and not for the neurology specialist. This is perhaps because they do not see the clinical importance of some topics in Neuroanatomy, like the complex connection of the thalamus and

the hypothalamus. This brings to mind the recurrent question of how much neurology should a medical student learn and perhaps consider the proposal to use “hypothesis-guided neurologic examination versus the complex screening neurological examination.”<sup>12-14</sup> To acclimatize medical students to “non-cooperating” intubated, comatose and aphasic patients, gradual clinical exposure to complex neurological cases at the Out Patient Clinic can be used at Level II then cooperative ward patients at Level III. Understanding techniques of doing a neurologic examination of comatose or uncooperative patients should be given more time before entry to Level IV. The rest of the suggestions are similar to many studies that explore solutions to neurophobia, like drawing, video, longer rotation and uniform examination technique.<sup>10,15,19-21</sup>

Early clinical correlation in neuroanatomy is a common suggestion from systematic reviews addressing neurophobia but the participants further suggest to use, clinical-anatomic correlation to reinforce subsequent subjects in neurology at higher levels.<sup>11,15</sup> The other proposals are various learning enhancing techniques like drawing, creating plastic models of the brain, simplifying the teaching and localization exercises.

Neurophobia appears to exist in Philippine medical colleges and the cause is multifactorial. Early clinical correlation in Neuroanatomy, emphasis on subjects relevant to a generalist and utilization of various teaching interventions and tools are the common suggestions.

### **Suggestions**

The findings from this study will have to be verified and strengthened by quantitative measures that will include the various medical schools in the Philippines, a project that becomes more compelling in the light of the recently enacted Philippine Mental Health Law. This law commits the government to support care programs for those with psychiatric and neurological afflictions and more importantly, education and training of care providers.

### **Limitation**

Though the FGD included graduates from two other medical schools, the participants were mainly from the university where the investigator teaches. Teaching models for neuroscience vary in different

institutions and exposure to clinical neurology is limited in many settings. Teachers in basic neurosciences and clinical neurology may not be neurologists or may have different medical interests. The possible causes of neurophobia may be more daunting than what the participants experienced. These will have also a possible impact on the solutions suggested in the FGD.

### Summary

The experiences and perceptions of former students with the neurology curriculum during their

four years of medical school reveal the following during the focus group discussion (Figure 1):

1. The struggles of the medical students were described by several words, the meaning of which can be influenced in so many ways. Several specific areas of difficulties or contributing factors may directly or indirectly influence the negative perception and experiences. Students reviewed transcriptions, accessed quick-reference books, practiced repetitions of exams, recalled past teachings, drew interest and owned initiatives. These were all coping efforts.

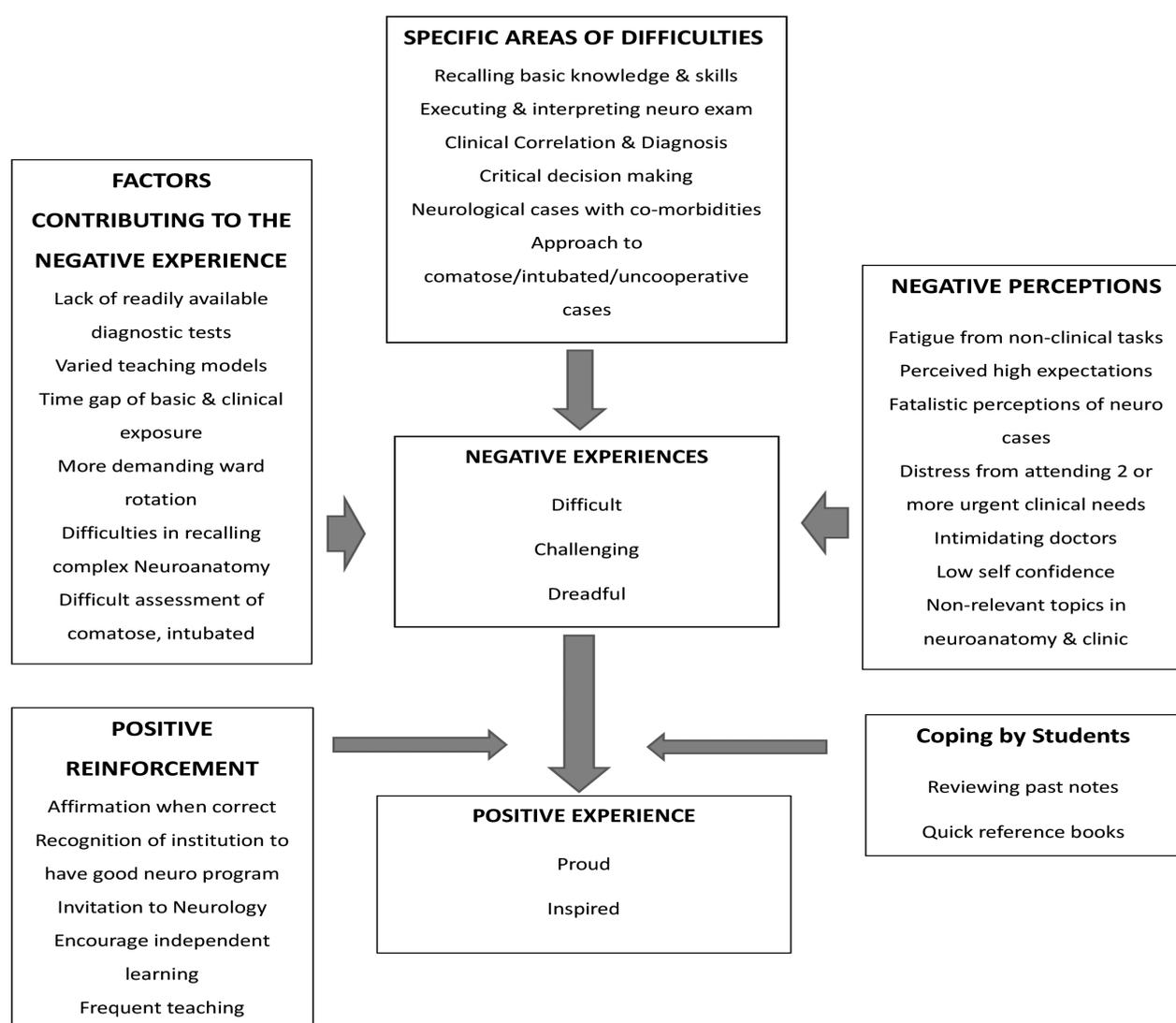


Figure 1. Factors contributing to negative perceptions and positive experiences encountered in the clinical rotation.

2. The struggles in the neuroscience subjects and clinical problems experienced by the discussants during four years of medical school focused on two levels: clinical clerkship (Level IV) and Neuroanatomy (Level I). The issues at Level IV are bridging and recalling basic neurological knowledge and skills with an approach to the neurologic patient for the first time, critical decision making in the absence of diagnostic tools, and coping with non-clinical pressures. In neuroanatomy, the concerns raised were difficulties in understanding, memorizing and remembering complex tract circuits. They found the neuroanatomic - clinical correlation interesting and suggested more of these exercises.
3. The recurrent theme of “pressures in the clinic” that was seen negatively, came about in the discussion rather strongly and prompted further probing. Two aspects arose from the discussions: the first is the acceptable pressure described as getting many but meaningful tasks and second, more teachings instead of imposing rules, strict sanctions for mistakes and sometimes demeaning comments in failures to answers questions. These created ill feelings in the students.
4. The participants gave several proposals, based on experience to enhance the learning of these difficult subjects in the clinical setting. The commonly shared proposals were enhancing hierarchal teaching rounds, conducting teaching in a more conducive environment, emphasizing the direction of teaching for the general practice, and the use of drawings. Other suggestions were gradual exposure to the complex clinical cases, longer neurology rotation, uniform examination techniques, and audiovisuals of normal and abnormal neurological examinations.
5. Their suggestions for Neuroanatomy were an early clinical correlation and a brief review of neuroanatomy at all levels, creating theoretical lesions for localization and correlation, simplifying and emphasizing only what is relevant in general practice, use of brain models and drawing structures and tracts.

## References

1. Glaser BG, Strauss A. *Discovery of grounded theory: Strategies for qualitative research*. Chicago: Sociology Press; 1967.
2. Strauss A. *Qualitative analysis for social scientists*. Cambridge, England: Cambridge University Press; 1987.
3. Glaser B. *Basics of Grounded Theory Analysis*. Mill Valley, CA: Sociology Press; 1992.
4. Krueger RA. *Developing Questions for Focus Groups*. Thousand Oaks, CA: Sage; 1998.
5. Krueger RA. *Moderating Focus Groups*. Thousand Oaks, CA: Sage; 1998.
6. Krueger RA. *Analyzing and Reporting Focus Group Results*. Thousand Oaks, CA: Sage; 1998.
7. Jozefowicz RF. Neurophobia: The fear of neurology among medical students. *Arch Neurol* 1994; 57(4): 328-9.
8. Fantaneanu T, Moreau K, Eady K, et al. Understanding the genesis of neurophobia: A mixed-methods study of trainees' perceptions of neurology education. *Ann Acad Med Singapore* 2013; 42: 559-66.
9. Zinchuk AV, Flanagan EP, Tubridy NJ, Miller WA, McCullough LD. Attitudes of US medical trainees towards neurology education: “Neurophobia” – a global issue. *BMC Med Educ* 2010; 10: 49.
10. Youssef F. Neurophobia and its implications: Evidence from a Caribbean medical school. *BMC Med Educ* 2009; 9:39.
11. McCarron M. A Systematic review of neurophobia and perceived causes among medical students and junior doctors. *J Neurol Neurosurg Psychiat* 2012; 83(3): e1.
12. McColgan P, McKeown PP, Selai C, Doherty-Allan R, McCarron MO. Educational interventions in neurology: A comprehensive systematic review. *Eur J Neurol* 2013; 20(7): 1006-16.
13. Charles PD, Scherokman B, Jozefowicz RF. How much neurology should a medical student learn? *Acad Med* 1999; 74: 23–6.
14. Kamel A, Dhelwal G, Navi BB, et al. A randomized trial of hypothesis driven vs screening neurologic examination. *Neurology* 2011; 77: 1395-400.
15. Karrison JP. Teaching clinical medicine by iterative hypothesis testing: Let's preach what we practice. *N Engl J Med* 1983; 309: 921-3.
16. Nigel CK Tan. Educational interventions in neurology: a comprehensive systematic review--reply to letter. *Eur J Neurol* 2013
17. Matthias AT, Nagasingha P, Ranasinghe P, Gunatilake SB. Neurophobia among medical students and non-specialist doctors in Sri Lanka. *BMC Med Educ* 2013; 13(1): 164.
18. Sanya EO, Ayodele OE, Oldanrewaju TO. Interest in neurology during medical clerkship in a Nigerian Medical School. *BMC Med Educ* 2010; 10; 36.
19. Fisch A. *Neuroanatomy: Draw it to Know it*. 2nd edition. Oxford: Oxford University Press; 2012.
20. Lim EC, Ong BK, Seet RC. Using videotaped vignettes to teach medical students to perform the neurologic examination. *J Gen Intern Med* 2006; 21: 101.
21. Cuoco JA. Medical student neurophobia: A review of the current pandemic and proposed educational solutions. *Europ J Educ Sci* 2016; 3(3): 41-6.

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# Mental health promotion program to enhance maternal adjustment among postpartum women

Ria Valerie D. Cabanes, MAN, RN

## Abstract

**Introduction** A statistical extrapolation reported 126,826 cases of post partum depression in the Philippines in 2004, prompting the proposal of the Postpartum Depression Research Act of 2007. This quasi-experimental research tested the Mental Health Promotion Program for Postpartum Women. The study elaborated the link between identified high-risk mothers for postnatal mood disturbances and effect of the intervention two weeks postpartum.

**Methods** This was conducted using Postnatal Depression Predictor Inventory Scale-Revised, administration of a two-week Mental Health Promotion Program for Postpartum Women consisting of self-mastery, social support and sleep; and evaluation of postnatal depression scores of mothers through Edinburg's Postnatal Depression Scale two weeks after giving birth.

**Results** Mothers who are at risk of developing postpartum mood disorders were predominant. It also discovered that majority of high-risk mothers reported depressive symptoms. There was no significant difference in the postpartum mood between the study and control groups after the Mental Health Promotion Program for Postpartum Women. The intervention was able to address three factors: blaming oneself, fear and panic without reason, and difficulty sleeping due to sadness.

**Conclusion** There is no significant difference in the postpartum mood between the control and study group after the intervention, however, the Mental Health Promotion Program for Postpartum Women was able to successfully target three factors: blaming oneself, fear and panic without reason, and difficulty sleeping due to sadness.

**Keywords:** Postpartum depression, postnatal depression, postpartum blues, mental health, postpartum women

Many cases of postpartum depression go undetected because most mothers are already discharged before they develop symptoms of blues

or depression. During their short hospital stay, the patient interactions with nurses are more frequent as compared to patient-doctor interaction. Nursing knowledge from research has advanced far enough in confirming risk factors, the nature of this mood disorder across cultures, and its prevalence.<sup>1</sup> The importance of the role of nurses was seconded by a study conducted by Segre and concluded that nurses who have frequent contact with women during the perinatal period are well-positioned to provide screening and treatment for postpartum mood disturbances.<sup>2</sup> This encouraged the researcher to create a nurse-led intervention that holistically addresses different factors of postpartum mood disturbances.

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### Correspondence:

Ria Valerie D. Cabanes, MAN, RN, College of Nursing, University of the East Ramon Magsaysay Memorial Medical Center Inc., 64 Aurora Boulevard, Barangay Doña Imelda, Quezon City, PH 1113; e-mail: rvcabanes@gmail.com

College of Nursing, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

Abundant information regarding postpartum mood disturbance is available, however, readings about the condition in non-Western settings are limited. Current records on the status of postpartum mood disturbance in the Philippines are even more inadequate. The study intended to fill gaps concerning the location in literature and to provide more evidence of the effects of the Mental Health Promotion Program for Postpartum Women which could give guidelines and motivate heightened use. The nurse-led intervention formulated for this study is guided by the theory of Cheryl Tatano Beck's "Teetering on the Edge"; at the same time, it is culture-sensitive, delivering a holistic approach in preventing postpartum mood disturbances. This study acknowledges the presence of Philippine factors (strong family ties, being one of the happiest countries, and being a third-world country) that could also affect the development of maternal blues and other mental disorders.

The study on the effectivity of Mental Health Promotion Program for Postpartum Women is essential for several reasons. Primarily, it contributes to the very meager literature about the topic in South East Asia, most particularly in the Philippines. Second, the study can create a protocol which allows early detection and prompt action in combating the increasing number of undetected postpartum mood disturbances not only among Filipinas but in the rest of the world. Lastly, mothers who are hesitant to undergo pharmaceutical treatments can now have another option to address their psychological condition.

The study aimed to test the Mental Health Promotion Program for Postpartum Women based on Cheryl Tatano-Beck's Theory, "Teetering on the Edge," identify the proportion of mothers at risk for developing postpartum mood disorder, determine the level of postpartum mood disturbance among mothers at risk, find the significant difference in the postpartum mood between the control and study group after the intervention, and to identify significant relationship between mother's postpartum mood and the following variables: demographic, mental, social support and post-natal issues.

## Methods

This quasi-experimental research aimed to test the Mental Health Promotion Program for Postpartum

Women based on Cheryl Tatano-Beck's Theory, "Teetering on the Edge." The study elaborated the link between mothers identified as high-risk for postnatal mood disturbances and effect of the intervention two weeks postpartum. This was conducted through the use of the Postnatal Depression Predictor Inventory Scale-Revised (PDPI-R), administration of a two-week Mental Health Promotion Program for Postpartum Women: self-mastery, social support and sleep; and evaluation of postnatal depression scores of mothers through the Edinburgh Postnatal Depression Scale (EPDS) two weeks after giving birth.

Patients confined in a level 3 tertiary hospital on their third trimester of pregnancy were invited to join the study. Mothers should be 18 years or older and if less than 18 years, have verbal and written consent from her legally authorized representative and written assent from the participant. The respondent must be able to read and write and should be fluent in speaking Filipino to be included. Mothers diagnosed with depression or complicated medical problems were excluded. Participants who developed medical complications after giving birth, had a stillbirth, failed to accomplish sleep logs completely for two weeks, or were lost to follow up after giving birth were withdrawn from the study.

Applying the G\*Power 3.0.10 software, the sample size was calculated at 50. The investigator used the two-tailed difference between independent means of two groups (study and control), family of t-test, with  $d = 0.8$  effect size,  $0.05 \alpha$  probability of error,  $0.8$  power ( $1-\beta$  error probability) and lastly,  $N2/N1$  allocation ratio equivalent to 1.

Qualified participants who gave their consent, and assent when indicated, were asked to answer a Demographic Datasheet and the translated version of PDPI-R. All mothers who reached the cut off score of 3.5 were made to answer the EPDS and then received the intervention Mental Health Promotion Program for Postpartum Women for two weeks. After two weeks, the participants from both study and control groups were followed up by phone and asked to answer the EPDS and the postnatal version of the PDPI-R to assess the effectiveness of the intervention. As advised by Beck, nurses should not wait until a woman's 6-week postpartum checkup to assess her status regarding postpartum depression if she was identified during pregnancy as being at risk for developing postpartum depression.<sup>6</sup> Beck, Records

and Rice also mentioned that pregnant women who obtained a score above the recommended cutoff score of 7.5 in the PDPI-R should be followed closely during the postpartum period.<sup>6,7</sup>

The telephone-based follow up is efficacious, cost and time-saving, and it even reduces barriers secondary to child-care when follow-up is conducted through face to face.<sup>8,9</sup> The studies also add that telephone contact is an appropriate, cost-effective and useful method to engage patients. Telephone-based support was also concluded to be beneficial as mothers can access postpartum information and care and even receive real-time responses. Moreover, postpartum depression was effectively decreased by the intervention they performed through phone support.<sup>10</sup> Just like many of the respondents, mothers preferred “talking therapies” with someone who was non-judgmental rather than pharmacological interventions, marking a similarity with the findings of Dennis and Chung-Lee reporting higher levels of positive relationship quality than the control group.<sup>11</sup> In the same light, the respondents of Latourneau also prefer emotional and one to one support by telephone.<sup>12</sup>

The pre- and post-intervention EPDS scores of the study and control groups, respectively, were compared using a paired t-test. The post-intervention scores of the study and control groups were compared using an independent t-test. Differences were considered significant if the p-value was less than 0.05.

The PDPI-R is a 39-statement tool consisting of 32 prenatal and 7 postpartum items that identifies 13 predictors or risk factors for depression. The validated Filipino version of the questionnaire was used. The items are answerable by “yes” or “no” and scored 1 and 0, respectively. A high score indicates a high risk of postpartum depression. The 3.5 cut-off score for the prenatal version used in this study has a sensitivity = 0.76 and specificity = 0.71.<sup>3</sup> The strongest predictors of postnatal depression are antenatal anxiety or depression, lack of social support and stressful life events; theoretically, addressing some of these features can prevent postpartum depression.<sup>4</sup> Thirty-seven experiments with the goal to reduce postpartum depressive symptoms in the meta-analysis of Sockol, Epperson and Barber who conducted their intervention during pregnancy or within 4 weeks puerperium.<sup>5</sup>

The EPDS is a 10-item survey tool with four possible responses scored from 0 to 3 with increasing severity of the symptom being tested. The maximum score is 30 points; a higher score is indicative of more depressive symptoms. A pre-test on the Edinburgh Postnatal Depression Scale was given to mothers with PDPI-R of 3.5 scores and beyond. The validated Filipino version of the questionnaire was used in this study.

The Mental Health Promotion Program for Postpartum Women is a nurse-led two-week intervention for women with postpartum depression. It consists of procedures for self-mastery, social support and sleep. Toolkits consisting of an educational booklet and a sleep log were given to women in the study group. Instructions were given and explained upon admission. A primary follow-up call was made after the mother gave birth to further discuss points in the booklet, the importance of social support and getting adequate sleep. The research assistant entertained questions from the participants and gave supplementary information.

The study was approved by the Ethics Review Board of the University of the Philippines. Written informed consent, and assent when applicable, were obtained from the participants. Measures were taken to ensure the confidentiality of the information obtained and the privacy of the data collected. The data were accessible only to those directly involved in the study.

## Results

Eighty women qualified for the study and the investigator was able to follow up 50 of them. As shown in Table 1, almost 90% of participants in the study group belong to the 20-34 year bracket while a third of the women in the control group were 35 years or older. The control group was significantly older than the study group ( $p = 0.049$ ). Most of the participants were multigravid, reached at least high school, come from low socio-economic strata and had several prenatal check-ups. The two groups were comparable except in age.

As shown in Table 2, there were more participants in the study group with possible depression (21 vs 16) but the difference was not significant ( $p = 0.017$ ). After the two-week intervention, the number of participants with possible depression was reduced by

half in both groups and the difference was significant in the study group ( $p = 0.003$ ). The difference in the number of participants without and with possible depression between the study and control groups was

not significant ( $p = 0.771$ ) as shown in Table 2. The mean post-intervention EDPS scores of both study and control groups decreased (8.72 vs 9.12) but the difference between groups (0.4) was not significant

**Table 1.** Demographic characteristics of the study group (n = 25) and control group (n = 25).

Variables, n (%)	Study	Control	XX2 / t	p-value
Age (yr)				
≤ 19	2 (8.0)	3 (12.0)	6.02	0.049
20-34	22 (88.0)	15 (60.0)		
≥ 35	1 (4.0)	7 (28.0)		
Parity			0.86	0.360
Primigravida	6 (24.0)	9 (36.0)		
Multigravida	19 (76.0)	16 (64.0)		
Educational attainment			4.74	0.093
≤ Elementary	3 (12.0)	1 (4.0)		
≤ High school	17 (68.0)	12 (48.0)		
≤ College	5 (20.0)	12 (48.0)		
Income (PHP)			1.43	0.700
≤ 5,000	15 (60.0)	14 (56.0)		
5,001-15,000	9 (36.0)	8 (32.0)		
15,001-25,000	1 (4.0)	2 (8.0)		
25,001-35,000	0 (0.0)	0 (0.0)		
35,001-45,000	0 (0.0)	0 (0.0)		
≥ 45,001	0 (0.0)	1 (4.0)		
Source of income			3.09	0.210
Work	21 (84.0)	7 (68.0)		
Business	3 (12.0)	3 (12.0)		
Relatives	1 (4.0)	5 (20.0)		
Social economic status			0.39	0.820
Extremely poor	1 (4.0)	2 (8.0)		
Poor	14 (36.0)	14 (56.0)		
Middle class	10 (40.0)	9 (36.0)		
Rich	0 (0.0)	0 (0.0)		
Extremely rich	0 (0.0)	0 (0.0)		
Prenatal check-up (n)			5.2	0.270
0	0 (0.0)	1 (4.0)		
1	0 (0.0)	1 (56.0)		
2	0 (0.0)	2 (8.0)		
3	1 (40.0)	0 (0.0)		
4	24 (96.0)	21 (84.0)		

**Table 2.** Comparison of proportion of participants without and with possible depression pre- and post-intervention in the study and control groups based on the Edinburgh Postnatal Depression Scale scores.

	Study (n = 25)		Control (n = 25)		p-value
	No depression	Possible depression	No depression	Possible depression	
Pre-intervention	4	21	9	16	0.107
Post-intervention	15	10	16	9	0.771
p-value	0.003		0.115		

**Table 3.** Comparison of mean pre- and post-intervention Edinburgh Postnatal Depression Scale scores of study and control group participants.

	Study	Control	p-value
Pre-intervention	11.08	10.92	
Post-intervention	8.72	9.12	0.772
p-value	0.021	0.970	

(Table 3). In the study group, the mean post-intervention EDPS scores were significantly lower ( $p = 0.021$ ) as shown in Table 3. There was significant improvement in the post-intervention mean EPDS scores in the study group for items 3 (blaming oneself), 5 (fear and panic without reason) and 7 (difficulty sleeping due to sadness) compared with item 7 alone in the control group.

The Postnatal Depression Predictors Inventory-Revised showed that more than half of the participants had the following factors: prenatal depression (68%), financial problems (under life stress, 62%), current marital/relationship problems (56%), prenatal anxiety (54%), and unemployment (under life stress, 52%). The following factors affected 25 to 49% of participants: unplanned pregnancy (48%), marital problems (44%), job changes (44%), perceived socioeconomic status (42%), history of depression (38%), moving or change of address (38%), unreliability of friends (32%), inadequate instrumental support from friends (30%); and serious illness in the family (26%).

Table 4 shows that the mothers' postpartum mood was not related with any of the demographic, mental or social support factors. The total EPDS score is significantly related with the participant mothers' mood ( $p = 0.19$ ).

## Discussion

The researcher excluded mothers who were having intense labor pains ( $n = 10$ ) as the condition can make the mother feel more vulnerable, experience self-pity and increase her perception of sadness. The feeling of being uncomfortable is heightened with all the examinations the mother needed to undergo -- assessment by the midwives, physical exams and interviews by interns and residents and the research assistants. This statement is backed by one of the mothers in Beigi's study saying that the diverse and

**Table 4.** Relationship of mother's postpartum mood with demographic characteristics and Postnatal Depression Predictors Inventory-Revised factors.

Variable	Chi-square/ correlation	p-value
<b>Demographic</b>		
Age	4.231	0.12
Marital status	0.006	0.97
Educational attainment	2.665	0.26
Parity	0.198	0.66
Number of pre-natal check-ups	4.112	0.39
<b>Economic status</b>		
Monthly income	0.713	0.87
Sources of income	3.125	0.21
Perceived economic status	1.994	0.37
<b>Mental</b>		
Self-esteem	0.028	0.85
Pre-natal depression	0.186	0.20
Prenatal anxiety	-0.007	0.96
Pregnancy intendedness	0.124	0.39
Prior depression	0.195	0.18
Marital satisfaction	0.475	0.10
Life stress	0.085	0.56
Postnatal maternity blues	0.132	0.36
<b>Social support</b>		
From partner	0.101	0.49
From family	-0.185	0.20
From friends	-0.197	0.17
<b>Postnatal issues</b>		
Child care stress	0.086	0.55
Infant temperament	0.146	0.31
EPDS total score	0.331	0.019

multiple examinations conducted further increased her labor pains.<sup>13</sup>

The important demographic characteristics in Table 1 were brought together as these are needed to be considered in 1) completion of the questionnaires and 2) identifying significant factors that could confound the outcome of this study.

### *Presence of depression Comparison of the pre-tests of subject groups*

Table 2 presents a comparable level of depression between the two groups having p-value of 0.107. This serves as the baseline data. Twenty-one (56.8%) mothers in the study group scored 10 or greater. Similarly, 16 mothers (43.2%) for the control group showed possible depression. Based on the

information, homogeneity between the study and control group is concluded. Thus, contamination of other influences in the overview of this study is counteracted ascribing all outcomes to the intervention given to the mothers.

*Study group: Pre- and post-tests compared*

A significant difference resulted ( $p = 0.003$ ) when the pre- and post-intervention outcomes of the study group were set against each other. The figures show a marked shifting of scores before and after the given intervention. The statistically significant correlation of the post-test result of the mothers in the study group and their EPDS total scores is supported by many works of literature. Social support is one of the most important predictors of postnatal depression, and that the mothers who received social support from health care staffs resulted to lesser anxiety scores.<sup>14</sup> Sleep, being one of the major focus of the present study here also brought positive changes in the mother's postpartum mood.<sup>15</sup>

*Control group: Pre- and post-tests compared*

The investigator has also observed that eight mothers (47%) out of the original 17 with possible depression during the pre-test of the control group obtained a score of 0-9 in the post-test; excluding them from the list of those with possible depression. A review conducted in Cochrane does not support the idea that social support decreases the chances of mothers of developing postpartum depression.<sup>8</sup> Side by side with other literature, the ambiguous definitions and the variety of studies conducted regarding it, the relationship of sleep and depression in postpartum women lacks clarity.<sup>24</sup>

*Post-tests compared*

There is no significant difference noted between the outcome of the two groups ( $p = 0.771$ ). Weighed against each other, the mothers who scored 0-9 are more compared to those with scores of 10-30 in both groups (48.4% for study and 51.6% for control). Fourteen studies which used the EPDS resulted in an average of 7.06 and 7.69 in the treatment and comparison groups, respectively.<sup>5</sup> Noting that higher levels of symptoms of depression before the treatment was given were associated with smaller

effect sizes. This contradicts the result of this study in which a small difference between the two groups was noted: slope = -0.07,  $p < 0.01$ .

*Edinburgh Postnatal Depression Scale Items*

The significant relationship of EPDS items 3, 5 and 7 (blaming oneself, fear and panic without reason, and difficulty sleeping due to sadness) between the two groups supports the statement of Beck that in prenatal depression, mothers carry a suffocating guilt towards their view of them failing in their mother roles.<sup>1</sup> This is also related to the guilt they would also feel when they have thoughts of harming their infants and themselves. Cheryl Tatano-Beck, the proponent of the "Tethering on the Edge" theory used in this research supports the items which a large number of eligible mothers was able to score 1 point. The presence of depression during pregnancy was found to be the strongest predictor of PPD. The other factors are prenatal anxiety, the feeling of uneasiness or apprehension which can occur anytime throughout the pregnancy, and marital or relationship problem, in which most of our mothers said they were having. Many of the mothers answered "yes" to the items under life stress. People living in urban areas compared to rural environments tend to perceive it higher.<sup>16</sup> Hence, mothers are expected to be more prone to PPD development. Loss of job is perceived to be a great risk factor because this is a significant life-changing experience for the mothers catapulting them into severe postpartum mood disorder. In addition, most of the women in the highly suicidal group were employed before they gave birth.<sup>17</sup>

*Mental (prenatal depression, prenatal anxiety, prior depression, postnatal blues)*

Although the study focused on how the mother feels after giving birth, it can be objectively measured, assessed, correlated with observable brain functions. It can also be related to the characteristics of an individual and the society.<sup>18</sup> Unintended pregnancy (ORR = 1.6–8.8) poses challenges for the mother as well.<sup>19</sup> Cognitive emotion regulation strategies like rumination, blaming oneself and catastrophizing were significantly related to high levels of total depressive scores.<sup>20</sup> In addition, lower postpartum depression scores are related to positive reinterpretation and concentrating on planning.

Life stress, prenatal anxiety, and fatigue are another significant risk factors and predictors reported by multiple nurse researchers.<sup>1</sup> Be that as it may, life stress, prenatal anxiety, and poor social support from the partner has no significance on the post-test total scores of the mothers' EPDS in this study. Women need the mental conformities and reorganization of interpersonal relations occurring in the postpartum period. These researches noted that self-esteem is one of the variables that affect pregnancy outcomes and postpartum period. The results of this study showed that self-esteem is not a significant factor.

#### *Social Support*

Social support is thought to facilitate a woman's transition to motherhood and is found to be significantly associated with maternal role development.<sup>21</sup> Mothers are more likely to turn to and receive support from their partner than from any other individual. This explains the saliency of the father's functioning as a support person.<sup>22</sup> The birth of a child is a stressor that can significantly affect both parents. Marital satisfaction, when correlated to the results of the EPDS post-test in this study was not significant.

#### *Postnatal issues (child care stress, infant temperament)*

In Asian countries, infant-related factors include: having emergency delivery - about two times increased risk of PPD and having vaginal delivery in modernized countries.<sup>23</sup> The results of this study show that infant temperament is not significantly correlated with the results of EPDS post-test. There are direct correlations with the sleep and feeding patterns of infants and the development and extent of PPD in mothers.<sup>15</sup>

#### *Sleep Log*

The basic amount of sleep for adults is around 6 hours per night. This research, on the other hand, discovered that out of 25 mothers who submitted their sleep log for 12 days after giving birth, only six of them had an average sleep of 6 hours or more. The rest of the mothers showed a duration of sleep from the 1.83 to 5.67 hours. The altered sleep patterns are commonly caused by newborn sleep and

feeding patterns.<sup>23</sup> Disrupted sleep may contribute to the type of PPD of the mother.<sup>15</sup> As to the reasons for waking up, 68% said that the crying infant woke them up. Almost half of the mothers said that they were satisfied upon waking up despite sleeping for less than 6 hours. The results of this study showed that there is a negative middle to low correlation of the number of hours of sleep and the final Edinburgh Postnatal Depression Scale score of the mothers ( $-0.480$ ,  $p = 0.015$ ). This means that the less sleep the mother has, the higher is her probability to develop postpartum depression. Maintaining circadian rhythm during the postpartum is very important.<sup>25</sup> It was revealed in several studies that sleep disturbance is highly correlated with elevated cortisol; example: during both second and third trimesters, the depressed women had more sleep disturbances and higher depression, anxiety and anger scores.<sup>26</sup>

The conducted study found out that mothers who are at risk for developing postpartum mood disorders comprised majority of the mothers invited to the study, attesting the need for interventions to address the problem. It was also discovered that among the high-risk mothers, the majority of the group reported depressive symptoms. Although there is no significant difference in the postpartum mood between the control and study group after the intervention, it can be deduced that the Mental Health Promotion Program for Postpartum Women was able to successfully target three factors: blaming oneself, fear and panic without reason, and difficulty sleeping due to sadness. There is a need for protocol improvement to be able to address other factors. The significant relationship between the total post-test scores of EPDS and PDPI-R validated that the mothers who were identified to be high risk would most probably manifest postpartum depressive symptoms. Lastly, the negative low to moderate relationship between the number of hours of sleep of the mothers and their PDPI-R scores is consistent with other studies indicating ineffectual sleep as one of the main causes of postpartum mood disorders.

The following are recommended based on the outputs gathered: for nurse administrators, a systematic approach to identifying postnatal mood disturbances at the earliest time possible - during mother's prenatal assessment using Postnatal Depression Predictors Inventory-Revised for prevention, detection and early intervention as well

as administering PPD screening through the 10-item Edinburgh Postnatal Depression Scale prior discharge. There should also be improved referral and collaboration with barangay health workers, nurses, psychiatric physicians, and support groups. Nursing educators can consider incorporating or strengthening topics or modules which increase awareness of postpartum depression and reinforce the use of proper communication skills to nurses and student nurses to encourage mothers to verbalize and discuss negative feelings. Researchers planning to pursue this topic should increase the number of respondents, improve the structure of intervention - intensify health education by conducting it throughout the mother's prenatal checkup rather than only two times; and use methodical transition of the patient from midwives and nurses on duty to research assistant. It is also suggested to develop stringent means for follow up particularly in verifying improvement on mother's knowledge from health teaching and explore other means of follow up: intensive confirmation of home address and cellphone numbers. Lastly, focus on targeting other factors aside from fear, and panic without reason, and difficulty sleeping due to sadness.

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### Declaration of conflict of interest

None

### References

1. Beck C. State of science on postpartum depression: What nurse researchers have contributed – Part 1. *MCN Am J Matern Child Nurs* 2008; 33(2): 121-6.
2. Segre L, O'Hara M, Arndt S, Beck C. Nursing care for postpartum depression: Part 1: Do nurses think they should offer both screening and counseling? *MCN Am J Matern Child Nurs* 2010; 35(4): 220-5.
3. Oppo A, Mauri M, Ramacciotti D, et al. Risk factors for postpartum depression: The role of the Postpartum Depression Predictors Inventory-Revised. *Arch Women Ment Health* 12: 239-49.
4. Morell J. Review of interventions to prevent or treat postnatal depression. *Clin Eff Nurs* [Internet]. 2006 [Accessed 2 Mar 2016]; doi: 10.1016/j.cein.2006.11.006
5. Sockol, Epperson, Barber Mayo Clinic. High risk pregnancy: Know what to expect [Internet]. 2004 [Accessed 2 Mar 2016]. Available from: <http://www.mayoclinic.org/healthy-lifestyle/pregnancy-week-by-week/in-depth/high-risk-pregnancy/art-20047012>
6. Beck C. Revision of the Postpartum Depression Predictors Inventory. *J Obstet Gynecol Neonat Nurs* 2002; 31: 394-402.
7. Beck C, Records K, Rice M. Psychometric assessment of the Postpartum Depression Predictors Inventory-Revised. *J Nurs Meas* 2007; 15.
8. Lewis B, Gjerdingen D, Avery M, Guo H, Sirard J, Bonikowske A, Marcus B. Examination of a telephone based exercise intervention for the prevention of postpartum depression: Design, methodology, and baseline data from The Healthy Mom Study. *Contemp Clin Trials* 2012; 1150-8.
9. Cardone I, Kim J, Gordon T, Gordon S, Silver R. Psychosocial assessment by phone for high-scoring patients taking the Edinburgh Postnatal Depression Scale: Communication pathways and strategies. *Arch Women Ment Health* 2005; 9: 87-94.
10. Milani H, Azargashb E, Beyraghi N, Defaie S Asbaghi T. Effect of telephone-based support on postpartum depression: A randomized controlled trial. *Int J Fertil Steril* 2015; 9(2): 247-53.
11. Dennis C, Chung-Lee L. Postpartum depression help-seeking barriers and maternal treatment preferences: A qualitative systematic review. *Birth* 2006; 33(4): 223-31.
12. Letourneau N, Duffett-Leger L, Stewart M, Hegadoren K, Dennis C-L, Rinaldi C. Canadian mothers' perceived support needs during postpartum depression. *J Obstet Gynecol Neonatal Nurs* 2007; 36(5): 441-9.
13. Beigi N, Broumandfar K, Bahadoran P, Abedi H. Women's experience of pain during childbirth. *Iran J Nurs Midwifery Res* 2010; 15(2): 77-82.
14. Webster J, Nicholas C, Velacott C, Cridland N, Fawcett L. Quality of life and depression following childbirth: Impact of social support. *J Caring Sci* [Internet]. 2013 Jun [Accessed 9 Mar 2016]; 2(2): 147-55. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4161091/>
15. Park E, Meltzer-Brody S, Stickgold R. Poor sleep maintenance and subjective sleep quality are associated with postpartum maternal depression symptom severity. *Arch Women Ment Health* 2013; 16(6): 539-47.
16. Torres R, Baylon M, De Jesus V, Habana A, Vista B. Validation of the Edinburgh Postnatal Depression Scale (EPDS) among Filipino women. *Phil J Obstet Gynecol* 2005; 29(1): 25.
17. Boston University Medical Center. Mothers with postpartum depression with suicidal thoughts and their infant interactions. *Science Daily* [Internet]. 2009 [Accessed 11 Mar 2016]. Available from: [www.sciencedaily.com/releases/2009/09/090903163854.htm](http://www.sciencedaily.com/releases/2009/09/090903163854.htm)

18. Helliwell J, Layard R, Sachs J. World Happiness Report. Sustainable Development Solutions Network A Global Initiative for the United Nations [Internet]. UNSDSN. 2013 [Accessed 11 Mar 2016]. Available from: <http://unsdsn.org/resources/publications/world-happiness-report-2013/>
19. Fisher J, Cabral de Mello M, Patel V, Rahman A. Maternal depression and newborn health. Newsletter for the Partnership of Maternal, Newborn & Child Health, 2. Geneva. 2006.
20. Haga, S. Identifying risk factors for postpartum depressive symptoms: The importance of social support, self-efficacy, and emotional regulation [Internet]. PhD thesis. University of Oslo; 2011 [Accessed 30 Apr 2016]. Available from: <https://www.duo.uio.no/bitstream/handle/10852/18162/dravhandling-haga.pdf?sequence=3>
21. Warren P, McCarthy G, Corcoran P. Postnatal depression in first-time mothers: Prevalence and relationships between functional and structural social support at 6 and 12 weeks postpartum. [Internet]. 2011. doi: 10.1016/j.apnu.2010.08.005
22. Holopainen D. The experience of seeking help for postnatal depression. *Austral J Adv Nurs*. 2002; 19(3): 39-44.
23. Klainin P, Arthur D. Postpartum depression in Asian cultures. *Int J Nurs Stud* [Internet]. 2009 [Accessed 8 May 2015]; Available from: [http://ac.els-cdn.com/S0020748909000704/1-s2.0-S0020748909000704-main.pdf?\\_tid=aee6c84e-f545-11e4-a989-00000aacb361&acdnat=1431064216\\_c7cf3e0a1810f1fd5dc341deefe5632a](http://ac.els-cdn.com/S0020748909000704/1-s2.0-S0020748909000704-main.pdf?_tid=aee6c84e-f545-11e4-a989-00000aacb361&acdnat=1431064216_c7cf3e0a1810f1fd5dc341deefe5632a)
24. Hunter LP, Rychnovsky JD, Yount SM. A selective review of maternal sleep characteristics in the postpartum period. *J Obstet Gynecol Neonatal Nurs* 2009; 38: 60-8.
25. Marcus S, Barry K, Flynn H, Tandon R, Greden J. Treatment guidelines for depression in pregnancy. *Int J Gynaecol Obstetr* 2001; 72: 61-70.
26. Field T, Diego M, and Hernandez-Reif M. Prenatal depression effects and interventions: A review. *Infant Behav Dev* 2010; 33: 409-18.

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# Efficacy and safety of monopolar radiofrequency for the improvement of facial skin laxity and rhytides: A systematic review of clinical trials

Maria Niña F. Pascasio, MD; Sharon Margaret V. Wong, MD; Camille Berenguer-Angeles, MD; Cindy Jao-Tan, MD; Lian C. Jamisola, MD and Alma T. Amado, MD

## Abstract

**Introduction** There is a consistent increase in the interest and demand for non-invasive modalities to improve facial skin laxity and rhytides. Monopolar radiofrequency is one of such non-invasive modalities. This systematic review aimed to determine the efficacy and safety of monopolar radiofrequency in improving facial rhytides and skin laxity.

**Methods** Clinical studies that assessed the efficacy of monopolar radiofrequency to address clinically observable facial rhytides and skin laxity were included. Outcome measures included improvement in rhytides and skin laxity as documented by patient satisfaction scores, and investigator and third-person observer ratings based on clinical photographs and clinical scales.

**Results** Three studies involving 29 participants were included in this review. All studies reported 25-50% improvement in facial rhytides and skin laxity. Participants from the three studies were satisfied with the results. Transient erythema was reported in several patients.

**Conclusion** Monopolar radiofrequency appears to be beneficial and safe for patients with facial rhytides and skin laxity. However, the evidence is inconclusive due to problems in the methodological quality of each trial and the heterogeneity of the studies included in this review.

**Keywords:** monopolar radiofrequency, skin laxity, facial rhytides

Skin aging is the superimposition of chronic ultraviolet radiation-induced damage on intrinsic aging.<sup>1,2</sup> Its most characteristic feature is the

appearance of rhytides and lax skin due to increased degradation and decreased synthesis of collagen.<sup>1,3,4</sup> Collagen, which comprises more than 80% of the total dry weight of the dermis, becomes disorganized with reduced network formation.<sup>5</sup> The histologic hallmark of photodamaged skin is the accumulation of elastotic material in the papillary and mid dermis, replacing the normally collagen-rich dermis.<sup>5,6</sup> This process is known as solar elastosis.<sup>6</sup> It is estimated that 1% of the dermal collagen content is lost in adult skin every year.<sup>4</sup>

Skin quality, especially on the face, is considered as a major factor representing overall wellbeing, influencing the perception of health and beauty in humans. This is perhaps why many dermatologic

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### Correspondence:

Camille Berenguer-Angeles, Section of Dermatology, Department of Medicine, University of the East Ramon Magsaysay Memorial Medical Center Inc., 64 Aurora Boulevard, Barangay Doña Imelda, Quezon City, PH 1113; e-mail: camillebangeles7@gmail.com

Section of Dermatology, Department of Medicine, University of the East Ramon Magsaysay Memorial Medical Center, Inc., Quezon City, PH

patients seek consultation for the treatment of facial rhytides and skin laxity.<sup>7</sup> Improvement in the appearance of facial rhytides and skin laxity in the past has been achieved with surgery, lasers and other invasive modalities. These procedures, although considered as the standard of treatment, are invasive and thus involve significant adverse effects and downtime.<sup>8</sup>

In more recent times, there has been great interest in effective ways to decrease skin laxity and smoothen rhytides with minimal recovery time and decreased risks.<sup>8-10</sup> Non-invasive treatments are being sought after due to shorter downtime, which translates into less time lost from work and social endeavors.<sup>9,10</sup> A relatively new modality for the non-invasive treatment of facial aging is radiofrequency (RF). The United States Food and Drug Administration approved an RF device for the treatment of periorbital rhytides in 2002 and the treatment of facial rhytides in 2004.<sup>9</sup>

RF causes immediate collagen contraction and stimulates long-term production of new collagen.<sup>11</sup> RF devices generate electromagnetic energy to induce dermal heating to a critical temperature of about 65°C, which affects the molecular structure of the triple helix of the collagen molecule.<sup>1</sup> This induces subsequent breakage of intramolecular hydrogen bonds, resulting in collagen fibril denaturation with immediate contraction.<sup>11</sup> Furthermore, the normal inflammatory phase of healing stimulates fibroblasts to enhance new collagen deposition and remodeling, resulting in long-term dermal tightening and an overall increase in collagen content.<sup>12,13</sup> This provides a non-ablative means for facial rejuvenation by improving rhytides and lax skin.<sup>1,12</sup> RF can be delivered using monopolar, bipolar or unipolar devices.<sup>10</sup>

In monopolar RF devices, patients are grounded and the RF is delivered through the skin, into the body and ultimately to the grounding electrode. In bipolar devices, energy travels between a positive and a negative pole, both built into the hand piece. Unipolar devices have one electrode and a large field of RF emitted in an omnidirectional field around the single electrode. Compared to these devices, monopolar devices have a more deeply penetrating effect and are therefore preferred, having yielded dramatic results in treating signs of skin laxity, either as stand-alone or in combination with newer modalities.<sup>10</sup>

The use of monopolar RF in the treatment of rhytides and skin laxity is gaining popularity as a non-invasive option for facial rejuvenation, to address

skin changes brought about by aging. It can be used for patients who are willing to accept results less dramatic than those of the more invasive modalities in order to minimize adverse effects and recovery time. Interest in RF has grown in the past few years. Many clinical studies on this modality are emerging but there is yet to be a scientific article assessing the results and reliability of these studies. Based on this, a systematic review of the current evidence for the efficacy and safety of monopolar RF for rejuvenation of the face is needed by dermatologists in order to help their patients make informed choices about its use and to verify potential results.

The main objective of this systematic review was to determine the efficacy and safety of monopolar RF for rejuvenation of the face. The specific objectives were to determine the: 1) efficacy of monopolar RF in improving the appearance of rhytides, 2) efficacy of monopolar RF in decreasing skin laxity, and 3) safety of monopolar RF in the treatment of rhytides and skin laxity.

## Methods

Published and unpublished clinical trials from 2000 until September 2018 with full text that assessed the efficacy and safety of monopolar RF in adult men and women with clinically observable facial rhytides and skin laxity, of any age, race, ethnicity, and socioeconomic background were included in the systematic review. There were no language restrictions during the search for these trials. Studies that used monopolar RF in combination with other modalities (e.g., ultrasound, laser), or included patients who had undergone other treatment modalities (e.g., laser, surgery), or who were concurrently using topical medications for skin rejuvenation were also excluded.

The primary outcomes were improvement of facial rhytides and skin laxity. Clinical improvement of facial skin rhytides and skin laxity after treatment with monopolar RF compared to baseline defined as decrease in facial skin rhytides and laxity as assessed by the subjects and physicians. Secondary outcomes were tolerability and adverse effects associated with the use of monopolar RF for facial skin laxity and rhytides.

A literature search was conducted in the following databases: PubMed, Cochrane Library, EMBASE, HERDIN, UpToDate, and Clinical Key. Search terms included the keywords “mono-polar radiofrequency,”

“facial aging,” “facial rejuvenation,” “skin laxity,” “rhytides,” “adverse effects,” “skin tightening,” “randomized controlled trials,” “controlled clinical trial,” “clinical trial,” and “prospective studies.” The review was supplemented by footnote chasing, which had the bibliography of previously selected articles as reference. In addition, other sources like hand searching and consultation were utilized as well. Written and verbal communications with other Philippine Dermatological Society-accredited institutions, as well as pharmaceutical companies, were done to obtain published and unpublished trial data.

The authors obtained full text copies of all relevant studies. Studies that did not meet the inclusion criteria were excluded, and reasons for their exclusion were noted and included in Figure 1. Two of the authors (MP and SW) independently assessed the validity of the studies, and any disagreement on the eligibility of included studies was resolved through discussion and consensus or, if necessary, through the third author (AA).

Two of the authors (MP and SW) independently collected the data needed from each article using the Cochrane Collaboration data extraction form. Any disagreement in the extracted data was resolved by consulting the third author (AA). Details of the included studies are shown in Table 1. Selected studies were organized into a table for the general characterization of each study. Data regarding objectives, sample size, analyzed endpoints and obtained results were gathered.

Methodological quality was assessed by three authors (MP, SW, and AA) using the Methodological Index for Non-Randomized Studies (MINORS) tool. The same authors graded the selected trials using the NIH Quality Assessment Tool for Before-After Studies with No Control. A meta-analysis was not possible because of heterogeneity of included studies. The results of the studies are discussed individually.

## Results

Literature search yielded a total of 27 articles. By inspecting the titles and abstracts, 20 were selected for screening. Twenty full-text articles were retrieved and assessed for eligibility. Out of these, only three studies (Tay, El-Domyati and Taub) met the inclusion criteria and remained for qualitative review as shown in Figure 1.<sup>1,5,14</sup> All three clinical trials had only one study group and lacked control groups. The study population was diverse in terms of age, all composed of women. All volunteer subjects were diagnosed clinically by a physician to have skin laxity and rhytides on the face. The primary outcome assessed in all studies was clinical improvement of facial laxity and rhytides after treatment with monopolar RF. To document and analyze the clinical improvements, post-procedure photographs were evaluated and compared to baseline clinical photographs. All three studies explained the positive thermal effects caused by monopolar RF. The areas of the face involved, and the processing parameters used in each study are summarized in Table 1.

Tay enrolled six participants who were Asian women 30 to 60 years old diagnosed to have mild (class I) and moderate (class II) facial rhytides and skin laxity. Several areas of the face, name-ly the forehead, periorbital area, nasolabial folds, and cheeks were treated for four to six sessions at intervals of two to three weeks using a 1.75 MHz RF device (Photo Bio Care, Thailand). Clinical photographs

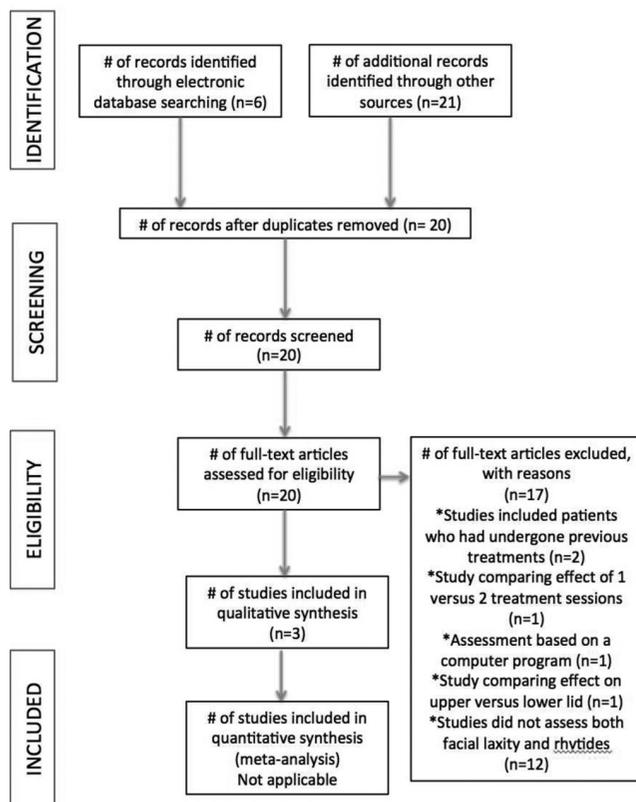


Figure 1. Search and selection process for clinical trials.

**Table 1.** Characteristics and results and safety profile of included studies.

Title, author year published	A novel radiofrequency device for the treatment of rhytides and lax skin Tay, 2009	Radiofrequency facial rejuvenation: Evidence-based effect El-Domyati, 2010	Facial tightening with an advanced 4-MHz monopolar radiofrequency device Taub, 2012
Intervention	Monopolar RF (Photo Bio Care, Thailand) 1.75 MHz Handpiece not indicated	Monopolar RF (Biorad, GSD Tech Co, China) 6-MHz 3-cm <sup>2</sup> tip	Monopolar RF (Pellevé) 4-MHz 5-mm and 10-mm handpiece; Each facial cosmetic unit treated with continuous motion technique
No. of patients	6	6	17
Treatment	Continuous, sweeping motion on forehead, periorbital area, cheeks, nasolabial folds	Two initial passes on the whole face then, ≥ 3 additional passes on periorbital and forehead regions	
No. of sessions	6	6	6
Interval	2 weeks	2 weeks	2 every 15 days 2 every month 2 every 2 months
Duration	3 months	3 months	
Methods:	Clinical trial; Pre- and post-treatment study		
	Comparison of photographs taken before, after & 2 months after last treatment	Comparison of photographs at baseline & at 3 & 6 months after treatment	Live viewing & comparison with baseline photographs at 2 weeks & 6 months after start of treatment
Outcome measure(s)	<ul style="list-style-type: none"> <li>Assessment of improvement of rhytides &amp; lax skin</li> <li>Patient satisfaction</li> <li>Evaluation by non-treating physicians</li> </ul>	<ul style="list-style-type: none"> <li>Assessment of improvement of rhytides, skin tightening &amp; texture</li> <li>Patient satisfaction</li> <li>Evaluation by subjects, treating and non-treating physicians</li> </ul>	<ul style="list-style-type: none"> <li>Assessment of overall improvement of facial skin</li> <li>Evaluation by subjects and treating physician</li> </ul>
Results	Two months after last treatment: <ul style="list-style-type: none"> <li>Mild to moderate (25–50%) clinical improvement in all patients</li> <li>All patients satisfied with treatment</li> </ul>	At the end of treatment: <ul style="list-style-type: none"> <li>35% to 40% improvement in skin tightening (P = 0.02)</li> <li>30% to 35% improvement in skin texture (P = 0.04)</li> <li>40% to 45% improvement in rhytides (P = 0.01)</li> <li>85% to 90% volunteer satisfaction (P = 0.001)</li> </ul> At three months post-treatment: <ul style="list-style-type: none"> <li>70% to 75% improvement in skin tightening (P = 0.001)</li> <li>65% to 70% improvement in skin texture (P = 0.002)</li> <li>90% to 95% improvement in rhytides (P &lt; 0.001)</li> <li>Volunteer satisfaction increased to 90% to 95% (P &lt; 0.001)</li> </ul>	Two weeks after first treatment: <ul style="list-style-type: none"> <li>Overall average of 25% to 30% improvement noted by patients</li> </ul> Just before the last (6th) treatment: <ul style="list-style-type: none"> <li>50% average improvement noted by physician</li> <li>48% average improvement noted by patients</li> </ul> At completion of study: <ul style="list-style-type: none"> <li>50% average improvement on average 6 months after completion of study:</li> <li>46% average improvement noted by treating physician</li> <li>30% average improvement noted by patients</li> </ul>
Safety/tolerability	<ul style="list-style-type: none"> <li>No unexpected side effects</li> <li>Post-treatment erythema resolved within 1–2 hours</li> </ul>	<ul style="list-style-type: none"> <li>Potential side effects, including erythema, edema, &amp; hypopigmentation or hyperpigmentation were evaluated on a 4-point scale (none, mild, moderate, and severe). One out of six volunteers developed slight erythema &amp; mild transient hyperpigmentation 2 days after 4th session, which subsided 5 days later. No scarring observed.</li> </ul>	<ul style="list-style-type: none"> <li>No significant side effects</li> </ul>
	<ul style="list-style-type: none"> <li>Discomfort was rated as mild</li> <li>Well tolerated</li> </ul>	<ul style="list-style-type: none"> <li>None experienced any signs of heat discomfort</li> <li>None reported intolerable hotness</li> </ul>	<ul style="list-style-type: none"> <li>Minimal to no discomfort</li> <li>No downtime</li> <li>Very well tolerated</li> </ul>
Notes	Skin punch biopsy also obtained to evaluate epidermal and dermal changes	Glogau scale also used for assessment	Fitzpatrick Wrinkle Scale (FWS) also used for assessment

were taken before, after the sixth treatment, and two months after the last treatment. Assessment of clinical improvement was through photographic evaluation by two non-treating blinded physicians using a quartile grading scale: mild ( $\leq 25\%$ ), moderate (26-50%), marked (51-75%), and excellent ( $> 75\%$ ) improvement. Other results recorded after completion of treatment were patient satisfaction score (A = not satisfied, B = somewhat satisfied, and C = highly satisfied) as shown in Table 1.

El-Domyati enrolled six volunteers who desired an improvement in the appearance of facial skin laxity and wrinkles. The participants were all women from a dermatology outpatient clinic in Egypt, 47 to 62 years old, with Fitzpatrick skin type III-IV, having mild (class I) and moderate (class II) facial rhytides based on the Glogau wrinkle scale. Two initial passes of the 150J (Biorad, Shenzhen GSD Tech Co, Guangdong, China) were performed over the entire face, then three or more additional passes using the 200J on the periorbital, nasolabial, and forehead areas. Standard photographs and facial skin biopsy specimens were obtained at baseline, end of treatment, and at three months post-treatment. During each follow-up visit, the participants, two doctors, and two independent observers were asked to evaluate the following: rhytides, skin tightening and texture, and overall volunteer satisfaction, using a 5-point scale (none = 0%, mild = 1-25%, moderate = 26-50%, good = 51-75%, and very good = 76-100%). Immunohistochemistry studies for elastin and collagen types I and III were done on the tissue samples.

Taub treated 17 patients with a 4 MHz monopolar RF device (Pelleve, Ellman International, Inc., New York). The participants' age, sex, severity and degree of facial rhytides and skin laxity were not mentioned. The patients underwent a total of six treatment sessions (one session every 15 days for two consecutive sessions, one session every month for two consecutive sessions and one session every two months for two consecutive sessions). Treatment was done on each cosmetic unit of the face with a continuous motion technique until a surface temperature of 40-42 °C was achieved then maintaining that temperature for an additional four to six passes. Patients were treated until erythema and clinical endpoint consistent with desired results were achieved. Both physician and patients assessed primary outcomes during each treatment session (every 15 days for two consecutive sessions, one session monthly for two months, then one session

every two months for two sessions). Physicians' and patients' ratings of improvement were assessed via live viewing and comparison with baseline photographs. It was not specifically mentioned whether adverse effects were noted after treatment (Table 1).

The study done by Tay reported mild to moderate (25-50%) clinical improvement of facial skin laxity and rhytides in all patients compared to baseline. All patients were somewhat satisfied with the treatment based on the patient satisfaction score. El-Domyati reported 30-45% improvement separately for facial skin laxity and periorbital rhytides. At three months post-treatment, subjects noted 70-75% improvement in skin tightening ( $p = 0.001$ ), and 90-95% improvement in rhytides ( $p < 0.001$ ). Patient satisfaction was 90-95% ( $p < 0.001$ ).

Results obtained were compared with baseline data obtained from doctor and observer assessment rates were comparable with subjects' ratings, but the exact percent improvement was not mentioned. In addition, evaluation of immunohistochemical staining of total collagen was done and the authors found an increase in dermal collagen content in response to RF. There was a narrow collagen band (grenz zone,  $9.8 \pm 3 \mu\text{m}$ ) at the dermoepidermal junction in volunteers before treatment. This slightly increased to  $11 \pm 3.6 \mu\text{m}$  at the end of treatment ( $p = 0.573$ ), and further increased to  $15.6 \pm 2.3 \mu\text{m}$  ( $p = 0.004$ ) three months post-treatment.

In the study conducted by Taub, patients rated an average self-improvement of 48%, while treating physicians rated an average improvement of 50% compared to baseline just before the last or sixth treatment. One year after treatment was initiated (6 months after the final treatment), the patients noted average improvement of 30%, whereas, the treating physician rated average improvement of 46% compared with baseline. The primary outcomes of the included studies are in Table 1, which summarizes the effects of monopolar RF on facial skin laxity and rhytides.

All the included studies reported that patients generally tolerated the procedure well, with mild to no discomfort. Tay reported post-treatment erythema that immediately resolved within one to two hours, but the exact number of patients who had erythema was not mentioned in the article. El-Domyati reported that one out of their six patients developed slight erythema and mild transient hyperpigmentation two days after the fourth session, which subsided five days later. All

included studies reported no significant adverse effects like blistering or scarring. The reported adverse effects and tolerability of patients in the included studies are summarized in Table 1.

Reporting and publication bias cannot be disregarded in this review due to the possibility of missed studies and the absence of unpublished studies, respectively.

## Results

This review aimed to determine the efficacy and safety of monopolar RF for the treatment of rhytides and skin laxity on the face. All three clinical trials showed improvement of facial rhytides and skin laxity. Safety and tolerability assessment in all trials showed that all patients who underwent the procedure tolerated it well.

The improvement of facial rhytides and skin laxity with the use of monopolar RF can be attributed to immediate collagen fibril contraction after the procedure.<sup>11</sup> More importantly, thermally mediated wounding and subsequent healing results in the induction of new collagen production as its long-term effect.<sup>11-13</sup> Redirection of dermal matrix fibers occurs, with newly-synthesized collagen replacing the elastotic materials that accumulate in the dermis as a result of photodamage.<sup>5</sup>

Evidence for the efficacy of monopolar RF for improvement of skin laxity and rhytides was inconclusive because the methodological quality of the eligible studies included in this systematic review was poor. When it comes to nonablative rejuvenation methods such as monopolar RF, the problem lies in the paucity of standardized and objective approaches to define the severity of rhytides and skin laxity. Furthermore, very few studies use these standardized scales. The use of different scales used in the assessment of skin laxity and rhytides makes the objective review of these studies challenging. Documentation through photographs is widely used in studies on RF, but this has proven to be an insufficient way of determining the efficacy of treatment.<sup>5</sup>

A meta-analysis could not be done owing to the lack of randomized controlled trials and the heterogeneity of the studies included in this review. There is also a possibility of publication bias of the included trials. To minimize such, hand searching of publications was done; one study was obtained, which, unfortunately, did not meet the inclusion criteria. In

addition to these general limitations, there were few unique problems for this review. Since monopolar RF is a non-pharmaceutical treatment, adequacy and applicability of blinding of the assessors, whether by the patient, the physician conducting the study, or even by an independent evaluator, remained a challenge. Nevertheless, blinding of independent assessors was done in two out of three trials. Physicians were blinded as to which photographs were taken at baseline and post-treatment.

## Authors' Conclusions

Monopolar RF appears to be beneficial and safe for patients with facial rhytides and skin laxity, but the evidence is inconclusive due to problems in the methodological quality of each trial and the heterogeneity of the studies included in this review. Well-designed randomized clinical trials are warranted to determine the efficacy and safety of monopolar RF by comparing different devices and handpieces with one another.

## References

1. Tay Y, Kyok C. A novel radiofrequency device for the treatment of rhytides and lax skin: A pilot study. *J Cosmet Laser Ther* 2009; 11: 25-8.
2. Puizina-Ivic N. Skin aging. *Acta Dermatoven* 2008; 17(2).
3. Sukal S, Geronemus R. Thermage: The nonablative radiofrequency for rejuvenation. *Clin Dermatol* 2008; 26: 602-7.
4. Wollina U. Treatment of facial skin laxity by a new monopolar radiofrequency device. *J Cutan Aesthetic Surg* 2011; 4(1): 7-11.
5. El-Domyati M, El-Ammawi T, Medhat W, et al. Radiofrequency facial rejuvenation: Evidence based effect. *J Am Acad Dermatol* 2010; 64: 524-35.
6. Uitto J. The role of elastin and collagen in cutaneous aging: Intrinsic aging versus photoexposure. *J Drugs Dermatol* 2008; 7: s12-6.
7. Ganceviciene R, Liakou A, Theodoridis A, Makrantonaki E, Zouboulis C. Skin anti-aging strategies. *Dermatoendocrinol* 2012; 4(3): 308-19.
8. Edwards A, Massaki A, Fabi S, Goldman M. Clinical efficacy and safety evaluation of a monopolar radiofrequency device with a new vibration handpiece for the treatment of facial skin laxity: A 10-month experience with 64 patients. *Dermatol Surg* 2012; 39: 104-10.
9. Abraham M, Mashkevich G. Monopolar radiofrequency skin tightening. *Facial Plast Surg Clin N Am* 2007; 15: 169-77.
10. Beasley K, Weiss R. Radiofrequency in cosmetic dermatology. *Dermatol Clin* 2014; 32: 79-90.

11. Zelickson BD, Kist D, Bernstein E, Brown DB, Ksenzenko S, Burns J. Histological and ultra-structural evaluation of the effects of a radiofrequency-based nonablative dermal remodeling device: A pilot study. *Arch Dermatol* 2004; 140: 204-9.
12. Hodgkinson D. Clinical applications of radiofrequency: Nonsurgical skin tightening (Thermage). *Clin Plastic Surg* 2009; 36: 261-8.
13. Ruiz-Esparza J. Nonablative radiofrequency for facial and neck rejuvenation. *J Cosmet Dermatol* 2006; 5: 68-75.
14. Taub AF, Tucker RD, Palange A. Facial tightening with an advanced 4-MHz monopolar radiofrequency device. *J Drugs Dermatol* 2012; 11(11): 1288-94.

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# Carcinosarcoma ex pleomorphic adenoma of the parotid gland with no history of long-standing or recurrent pleomorphic adenoma – a case report

Francia Victoria A. De Los Reyes, MD<sup>1</sup>, Socorro Cruz-Yañez, MD<sup>1,2</sup> and Maria Josefa DL. Mesina, MD<sup>1,2</sup>

## Abstract

*Carcinosarcoma ex pleomorphic adenoma* of the salivary gland is an extremely rare tumor of the major and minor salivary glands that is composed of a mixture of both carcinomatous and sarcomatous elements with an identifiable benign epithelial and mesenchymal tumor counterpart.

This report describes a rare case of *carcinosarcoma ex pleomorphic adenoma* involving the left parotid gland in a 61-year-old female with no history of a long-standing pleomorphic adenoma, nor a recurrent pleomorphic adenoma, and describes its morphology and important immunohistochemistry findings. *Carcinosarcoma ex pleomorphic adenoma* contains features of the two tumors under malignant mixed tumors, which are carcinosarcoma and carcinoma ex pleomorphic adenoma. Immunohistochemistry studies were done to document the epithelial and mesenchymal areas from both the malignant and benign sections of the tumor and to classify the carcinoma and sarcoma component, consisting of *adenocarcinoma, not otherwise specified* for the carcinoma component, and *myxoid chondrosarcoma and mesenchymal chondrosarcoma* for the sarcoma component.

The paucity of documented cases of *carcinosarcoma ex pleomorphic adenoma* in prior scientific publications requires reporting cases such as this. Furthermore, the report provides an insight into the more complex molecular and structural changes that manifest as cancer behavior in the tumors of the salivary gland. The case contributes to the fund of knowledge for diagnosis and improvement of quality of care.

**Keywords:** carcinosarcoma ex pleomorphic adenoma, pleomorphic adenoma, carcinosarcoma, parotid gland, salivary gland, immunohistochemistry

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### Correspondence:

Francia Victoria A. De Los Reyes, MD, Pathology Laboratory, University of the East Ramon Magsaysay Memorial Medical Center, Quezon City, 64 Aurora Boulevard, Barangay Doña Imelda, Quezon City, PH 1113; e-mail: kaidelosreyes@gmail.com

<sup>1</sup> Pathology Laboratory, University of the East Ramon Magsaysay Memorial Medical Center, Quezon City, PH

<sup>2</sup> Department of Pathology, College of Medicine, University of the East Ramon Magsaysay Memorial Medical Center, Quezon City, PH

**C**arcinosarcoma ex pleomorphic adenoma of the salivary gland is an extremely rare tumor of the major and minor salivary glands that is composed of a mixture of both carcinomatous and sarcomatous elements with an identifiable benign epithelial and mesenchymal tumor counterpart.<sup>1</sup> Only eight cases of carcinosarcoma ex pleomorphic adenoma have been described in scientific literature thus far. In comparison, approximately 50-60 cases of the more general classification of carcinosarcomas of the salivary gland have been identified. Carcinosarcomas

account for a significant minority and comprise 0.04–0.16 % of all salivary gland tumors and 0.5 % of malignant salivary gland neoplasms.<sup>2</sup>

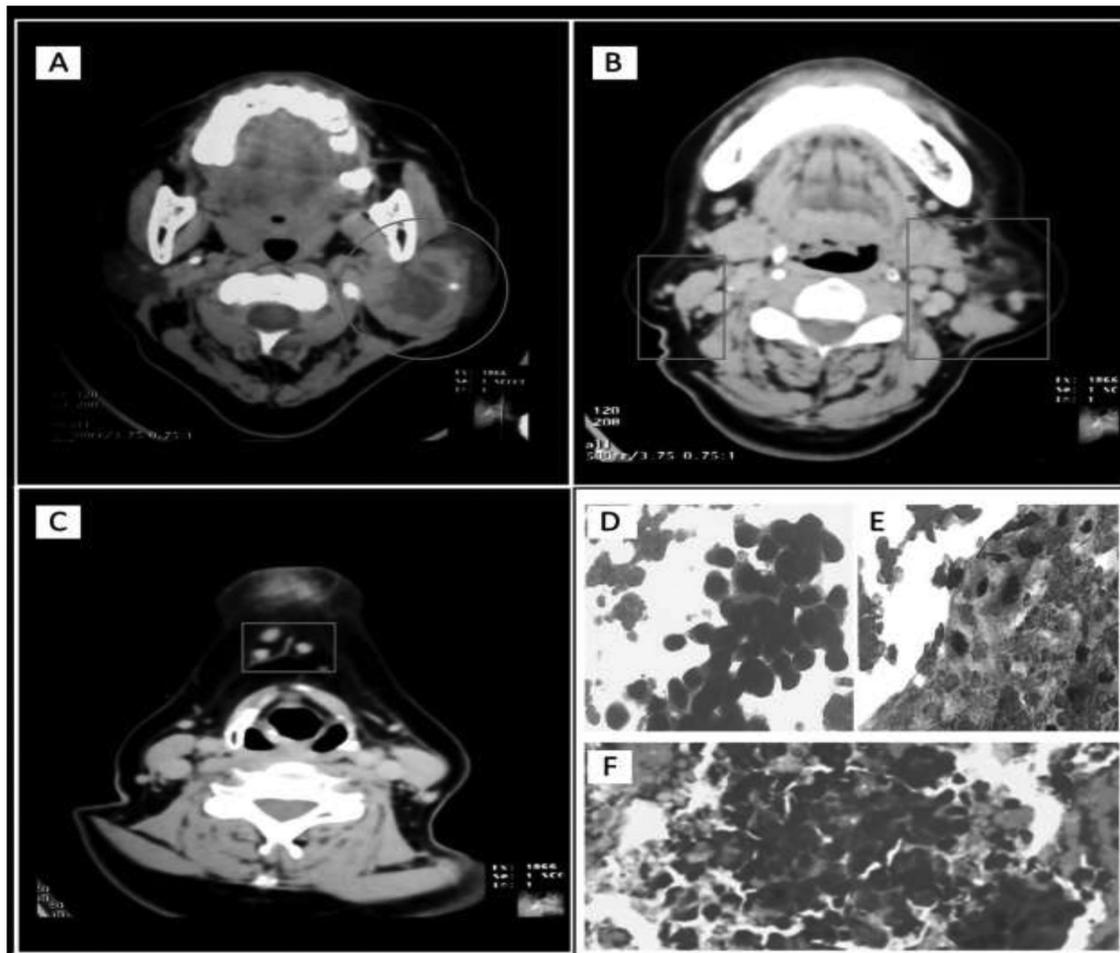
### The Case

This is the case of a 61-year-old female with a pre-auricular mass of seven months duration that began as a 1 cm, firm, non-tender, and non-erythematous mass. The initial imaging studies were done three months after the symptoms presented and showed a left parotid mass that measured 4 cm in widest diameter. The left parotid gland mass on CT scan was described as having a central hypodense area with calcification. The lesion was associated with multiple enlarged submandibular

and upper jugular chain lymph nodes on the right and left side of the neck.

### Diagnostic Assessment

Aspiration cytology was done, and the histologic evaluation showed findings that were highly suspicious for carcinoma (Figure 1. CT scan of the head and neck and aspiration cytology A-F). The patient was advised to undergo resection of the mass. Unfortunately, the patient did not agree to the surgical procedure until four months after the initial work-up. During the months that the patient did not have treatment, the mass increased to 15 x 10 cm. On the seventh month, she underwent total parotidectomy on the left side.



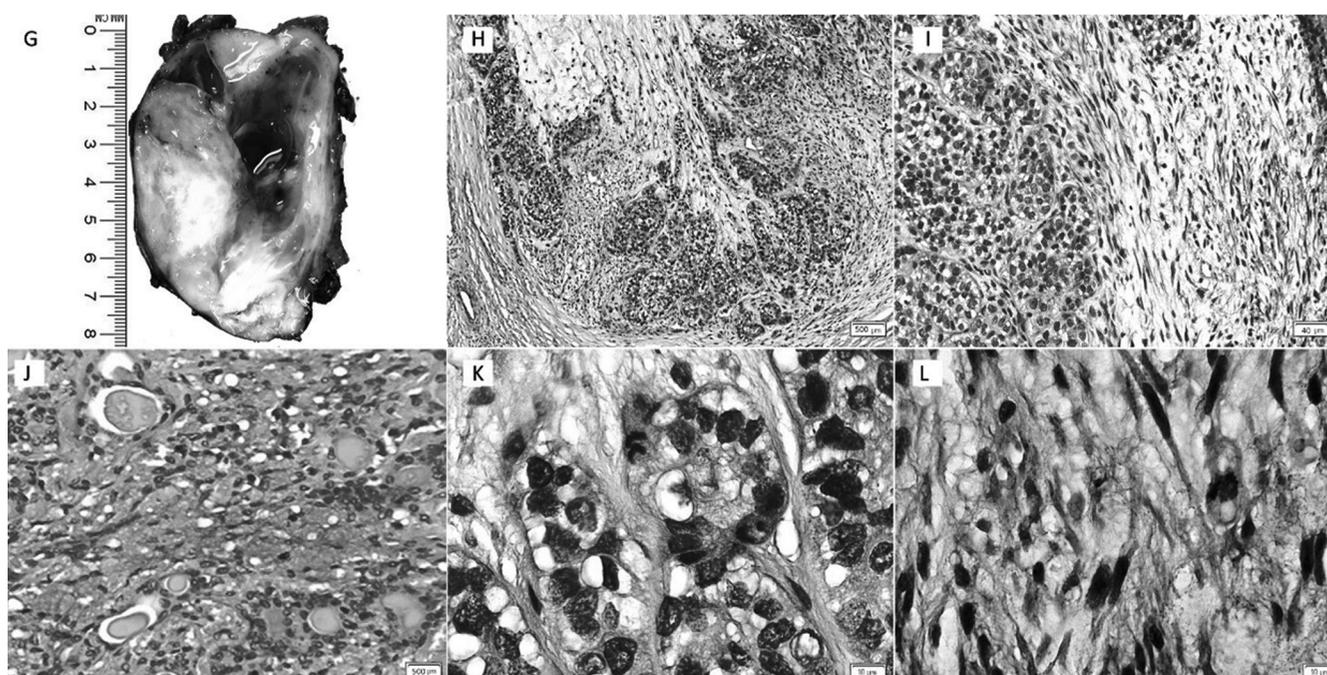
**Figure 1.** CT scan of the head and neck, parotid gland mass, and aspiration cytology  
1.A. Head and neck CT scan of the parotid gland mass, left shows a large mass with a central hypodense area and a sub-centimeter calcification within the mass  
1.B. Head and neck CT Scan shows bilaterally enlarged upper jugular chain lymph nodes.  
1.C. Head and neck CT Scan shows enlarged submental lymph nodes.  
1.D-F. Fine-needle aspiration biopsies, cytology, highly suspicious for carcinoma.

The parotid tumor consisted of a tan to brown, encapsulated, ovoid mass, measuring 8.5cm x 6.5cm x 6.0cm, and weighing 202 g. It had a cream white and fleshy cut surface with a circumscribed area that was yellow to brown, soft, translucent, and proteinaceous. A brown mucin-like substance with associated areas of hemorrhage were likewise noted. No extension of the mass beyond the fibrous capsule was documented. The diagnosis of the carcinosarcoma ex pleomorphic adenoma was based on the morphologic findings of a poorly-differentiated adenocarcinoma, not otherwise specified, that was seen as malignant epithelial islands within the more dominant sheets and fascicles of a malignant spindle cell neoplasm with features strongly consistent with myxoid chondrosarcoma, with components of mesenchymal chondrosarcoma, as well as a focal area of a malignant spindle cell neoplasm, not otherwise specified. Within the malignant encapsulated lesion was a focus of pleomorphic adenoma. (Figure 2. Gross specimen and microscopic findings G-L)

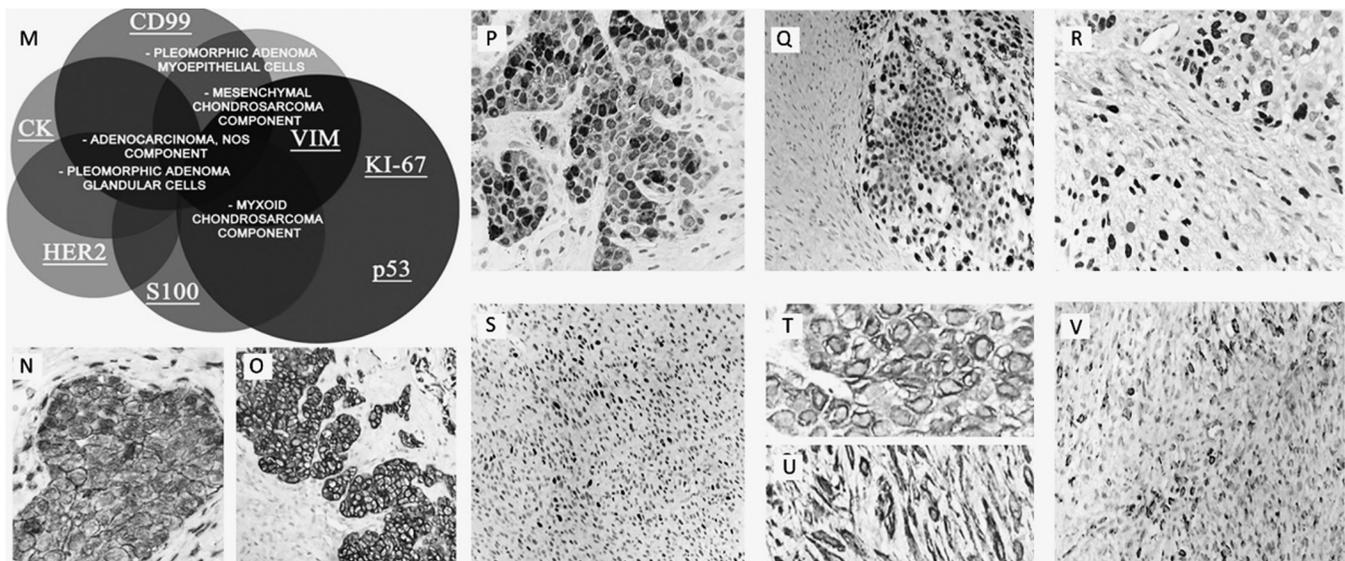
Immunohistochemistry studies were positive for cytokeratin (CKAE1/AE3), vimentin, S100, and HER2/neu expression in the carcinoma component, which was morphologically diagnosed as poorly differentiated adenocarcinoma, not otherwise specified. The sarcoma component was negative for both cytokeratin (CKAE1/AE3) and HER2/neu, and positive for S100 in the cartilaginous part of the myxoid chondrosarcoma component. CD99 was positive only in the mesenchymal chondrosarcoma component. Nuclear Ki67 expression was noted to be more than 15% in the carcinoma component and was observed in more than 50 cells/10 high power fields in the sarcoma component. The expression of p53 was likewise observed to be more than 20% in the sarcoma component. (Figure 3. Immunohistochemistry profile of the carcinoma and sarcoma component M-V)

### Interventions, Follow-up and Outcome

The patient was subsequently advised to undergo evaluation for tumor metastasis with a recommendation



**Figure 2.** Gross specimen and microscopic findings  
 2.G. Cut section of the left parotid gland mass gross specimen.  
 2.H. Scanner view of the carcinosarcoma component.  
 2.I. Low power view of the carcinosarcoma component.  
 2.J. Focus of pleomorphic adenoma component adjacent to the malignant component.  
 2.K. High-power view of the adenocarcinoma, not otherwise specified component.  
 2.L. High-power view of the myxoid chondrosarcoma component.



**Figure 3.** Immunohistochemistry profile of the carcinoma and sarcoma component

- 3.M. Venn diagram illustration the overlapping immunohistochemistry finding of the different components of the tumor.  
 3. N. Strong, diffuse, cytoplasmic membrane expression of cytokeratin (CKAE1/AE3) for the adenocarcinoma, not otherwise specified.  
 3. O. Strong, diffuse, distinct, complete membrane expression of HER2neu for the adenocarcinoma, not otherwise specified.  
 3. P. Diffuse, nuclear and cytoplasmic expression of S100 for the adenocarcinoma, not otherwise specified.  
 3. Q. Diffuse, nuclear and cytoplasmic expression of S100 in the cartilage component of the myxoid chondrosarcoma.  
 3. R. Nuclear expression of Ki67 in more than 15% of the adenocarcinoma, not otherwise specified component (★) and a nuclear expression of Ki67 in 50 cells/10HPF of the sarcoma component (•).  
 3. S. Nuclear expression of p53 in more than 20% in the sarcoma component.  
 3. T. Strong, diffuse, cytoplasmic membrane expression of vimentin in the adenocarcinoma, not otherwise specified component.  
 3. U. Strong, diffuse, cytoplasmic membrane expression of vimentin in the sarcoma component.  
 3. V. Moderate, cytoplasmic membrane expression of CD99 in the mesenchymal chondrosarcoma component.

for radiotherapy. No evidence of metastasis was noted one year after parotidectomy and radiotherapy.

## Discussion

As of 2016, only eight cases of carcinosarcoma ex pleomorphic adenoma have been reported in scientific publication. The first case contained elements that were definitively classified as the carcinoma and sarcoma component, with a pleomorphic adenoma observed within the lesion. This was described in 2006.<sup>3</sup> (Table 1. Comparison of reported cases of carcinosarcoma ex pleo-morphic adenoma) In terms of epidemiology, the youngest case described was that of a 35-year-old Malay male, and the oldest was that of an 84-year-old female described in a case report from Korea.<sup>4-5</sup> Among the salivary glands involved, seven cases presented in the parotid gland with only one case noted in the submandibular gland.<sup>3-10</sup> The patient in this case report is similar with the more common presentation, which is in the parotid gland.

The longest duration recorded of a pleomorphic adenoma with no definitive surgery that transformed into the malignant lesion is 20 years, while the shortest is 2 months.<sup>3,6</sup> However, two cases that had no documented history of a recently biopsied or prior long-standing pleomorphic adenoma have been described.<sup>5,8</sup> The patient in this report presented with a rapid growth of the mass in seven months with no documented history of a recently biopsied or prior long-standing pleomorphic adenoma.

The spectrum of the histopathologic diagnosis of the carcinoma component included squamous cell carcinoma (3 cases), poorly differentiated carcinoma (2 cases), poorly differentiated adenocarcinoma (2 cases), salivary duct carcinoma (2 cases), undifferentiated carcinoma (2 cases), moderately differentiated adenocarcinoma (1 case), and large cell neuroendocrine carcinoma (1 case). The sarcoma component varied from chondrosarcoma (3 cases), with one (1) case each of myxoid chondrosarcoma, spindle cell sarcoma, rhabdomyosarcoma, liposarcoma,

myofibrosarcoma, high-grade sarcoma with partial myoepithelial features, osteosarcoma and giant cell rich osteosarcoma.<sup>3-10</sup> For this case report, the patient's tumor components included a poorly-differentiated adenocarcinoma and a myxoid chondrosarcoma, which had been previously noted in two cases and in one case, respectively. However, this patient also has a component that showed the immunohistochemistry and histomorphologic features of a mesenchymal chondrosarcoma, which has not yet been documented previously in a carcinosarcoma ex pleomorphic adenoma.

Although limited information is available in terms of survival and prognosis, the case reported by Tan Eng Soon had a positive superior resection margin, subsequently developed involvement of the cranial nerves IX, X, XI and XII, and died after the completion of the 5th of 10 cycles of radiotherapy.<sup>3</sup> In comparison, the tumor in this case report was confined within the capsule and was still surrounded by uninvolved salivary gland tissue upon resection. Also, better prognosis may be conferred for the patient in this report because the surgical resection margins and the submitted cervical lymph node nearest the tumor showed no tumor involvement. No tumor recurrence in the course of the patient's adjuvant radiotherapy was documented.

The malignant transformation may have occurred in a committed benign cell lineage with mutations that predispose to accumulation of damage leading to a neoplastic proliferation. On the other hand, an uncommitted stem cell with an inherent genetic instability that may have given rise to two or more lines of differentiation that then further accumulated lesions in significant tumor suppression and proliferation regulating areas, subsequently triggering the development of a malignant neoplasm, is also speculated.

HER2/neu expression was found to be higher in cell membranes of high-grade carcinoma ex pleomorphic adenoma, a tumor which has an increased probability of recurrence and metastasis.<sup>11</sup> This may provide a useful information for the clinician when monitoring for recurrence of the carcinoma component of malignant mixed tumors. For disease-free survival, overexpression of Ki67 in salivary duct carcinomas may indicate an increase in tumor responsiveness to cytotoxic agents. Although no similar data is documented for adenocarcinomas that may have features of a salivary duct carcinoma

in a mixed tumor, it is useful in providing options for an unresectable, disseminated, and metastatic disease. The overexpression of p53 is an indicator of high proliferation and is associated with poorer prognosis.<sup>12-16</sup>

Since only eight cases of carcinosarcoma ex pleomorphic adenoma have been documented in scientific publication prior to this case, this contributes to the fund of knowledge for diagnosis and improvement of quality of care.

### Disclosure

This case report had no examinations performed on animal or human participants. This case report includes only the specimen submitted by the patient for surgical histopathology evaluation to the Section of Anatomic Pathology with consent for specimen evaluation and non-profit academic discussion or report.

The authors of this case report have no conflict of interest in relation to the conduct of this case report and the publication thereof. This study has no funding provided by the academic institution and has received no funding from any service provider related to the processing of the histopathology specimen and the ancillary immunohistochemistry of this case report.

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### References

1. Barnes L, Eveson J, Reichart P. Pathology and genetics of head and neck tumours. Lyon: Oxford University Press; 2005; 18: 242-4.
2. Alvarez-Cañas C, Rodilla IG. True malignant mixed tumor (carcinosarcoma) of the parotid gland. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* [Internet]. 1996; 81(4): 454-8. doi: 10.1016/s1079-2104(96)80023-0

3. T Tang Eng Soon V, Wee Y, Rom L, Azura Bte Mohamed Mukari S. Carcinosarcoma of the parotid: Parapharyngeal extension with facial nerve palsy and airway obstruction. *Int J Head Neck Surg* [Internet]. 2007; 2(1). doi: 10.5580/12cb
4. Norhafiza Mat Lazim GR. A rare presentation of carcinosarcoma in a long standing parotid mass. *J Otol Rhinol* [Internet]. 2015; 04(02). doi: 10.4172/2324-8785.1000221
5. Kim YS, Lim S, Lee MJ. A case of carcinosarcoma ex pleomorphic adenoma. *Med J Chosun Univ* 2013; 38(2): 103–6.
6. Chao T, Rassekh C, Loevner L, Cannady S, et al. Giant parotid carcinosarcoma (true malignant mixed tumor) arising in a pleomorphic adenoma: Preservation of the facial nerve by retrograde dissection and free flap reconstruction. *J Neurol Surg B: Skull Base* [Internet]. 2015; 76(S 01). doi: 10.1055/s-0035-1546680
7. Ishikura N, Kawada T, Mori M, Maegawa H, Ohta M, Imamura Y. Cytological features of carcinosarcoma ex pleomorphic adenoma of the parotid gland: A case report. *Acta Cytol* [Internet]. 2014; 58(4): 419–26. doi: 10.1159/000365272
8. Mok Y, Min En N, Chwee Ming L, Petersson F. Minimally invasive carcinosarcoma ex pleomorphic adenoma: A case report and literature review with cytohistological correlation. *Head Neck* [Internet]. 2016; 38(9): E2483–E2489. doi: 10.1002/hed.24462
9. Petersson F, Loh KS. Carcinosarcoma ex non-recurrent pleomorphic adenoma composed of TTF-1 positive large cell neuroendocrine carcinoma and myofibrosarcoma: Apropos a rare case. *Head Neck Pathol* [Internet]. 2012; 7(2): 163–70. doi:10.1007/s12105-012-0385-0.
10. Tanahashi J, Daa T, Kashima K, et al. Carcinosarcoma ex recurrent pleomorphic adenoma of the submandibular gland. *APMIS* [Internet]. 2007; 115(6): 789–94. doi: 10.1111/j.1600-0463.2007.apm\_647.x
11. Antony J, Gopalan V, Smith RA, Lam AKY. Carcinoma ex pleomorphic adenoma: A comprehensive review of clinical, pathological and molecular data. *Head Neck Pathol* [Internet]. 2011; 6(1): 1–9. doi: 10.1007/s12105-011-0281-z
12. Andreadis D, Pouloupoulos A, Epivatianos A, Nomikos A, Christidis K, Barbatis C. Carcinosarcoma of the parotid gland: Immunohistochemical analysis with emphasis in cell cycle mitotic activity and cell adhesion molecules expression. *Oral Oncol Extra* [Internet]. 2006; 42(4): 140–3. doi: 10.1016/j.ooe.2005.10.004
13. Bishop P. Immunohistochemistry vade mecum [Internet]. [Accessed 2016 Jan 31] Available from: <http://www.e-immunohistochemistry.info>.
14. Cavalcante RB, Lopes FF, Ferreira AS, Freitas R de A, Souza LB de. Immunohistochemical expression of vimentin, calponin and HHF-35 in salivary gland tumors. *Braz Dent J* [Internet]. 2007; 18(3): 192–7. doi: 10.1590/s0103-64402007000300003
15. Nagao T, Sato E, Inoue R, et al. Immunohistochemical analysis of salivary gland tumors: Application for surgical pathology practice. *Acta Histochem Cytochem* [Internet]. 2012; 45(5): 269–82. doi: 10.1267/ahc.12019
16. Ueda T, Aozasa K, Tsujimoto M, et al. Prognostic significance of Ki-67 reactivity in soft tissue sarcomas. *Cancer* [Internet]. 1989; 63(8): 1607–11. doi: 10.1002/1097-0142(19890415)63:8<1607::aid-cnrcr2820630827>3.0.co;2-1

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