



# International Journal of KIU



**Original Articles**

1. Preliminary Evaluation of Photoprotective Potential in Flowers of *Osbeckia octandra* (L.) DC. for Development of Herbal Sunscreen Formulations

*Liyanaarachchi C., Napagoda M., Witharana S., Jayasinghe L.*

DOI: <https://doi.org/10.37966/ijkiu2024051047>

Page 1-9

2. A Literature Review on Motivational Strategies to Elevate Engagement, Effective Communication, and Productivity in English as a Second Language (ESL) Classrooms

*Karunananda D.G.A.I.*

DOI: <https://doi.org/10.37966/ijkiu2024051048>

Page 10-16

3. The Quality of Life and Perceived Level of Stress among Mothers of Children with Congenital Heart Disease, in Sri Lanka

*Jayasinghe J.P.A.D., Jayasekara C.P.D., Pushpamali H.D.A.U., Fernando C.A., Jayamaha A.R., Dharmarathna H.H.N.D.*

DOI: <https://doi.org/10.37966/ijkiu2024051049>

Page 17-23

4. Use of Interaction for Enhanced Communication in English as a Second Language Classroom

*Nawanjala U.G.P.*

DOI: <https://doi.org/10.37966/ijkiu2024051050>

Page 24-29

5. Families' Perceptions of Support from ICU Nurses in Teaching Hospital, Karapitiya, Sri Lanka

*Dilhani M.G.T., Premathilaka A.W.A., Piumali K.J.P., Athukoorala A.A.C.D., De Silva W.I.C., Kariyawasam K.H.A.Y., Perera A.C.H., Nisansala M.W.N., Amarasekara A.A.T.D.*

DOI: <https://doi.org/10.37966/ijkiu2024051051>

Page 30-35

6. Knowledge regarding Human Papillomavirus Infection among Female Students in Kalutara District, Sri Lanka

*Jayathilaka A.D., Bandara E.M.N.M., Senarathna U.H.D.N.N., Withana A.S., Sanfara F., Fernando A.M.F., Rasanjane D.D.Y., Kottahachchi J.*

DOI: <https://doi.org/10.37966/ijkiu2024051052>

Page 36-43

## **About the Journal**

International Journal of KIU is a peer-reviewed, Google scholar-indexed, multidisciplinary, open-access journal published online and bi-annually in the print version. The journal provides a research platform for researchers and practitioners in all regions of the world thus contributing new insights into current and emerging concepts, theories, research and practice through diverse disciplines. The journal maintains high-quality standards by exercising peer review and editorial quality control.

## **Aim**

To create an academic platform for academics and students to put forth scientific research for review, disseminate significant findings and contribute to knowledge.

## **Copyright**

Copyright and Photocopying - All rights reserved by the International Journal of KIU. No part of this publication may be reproduced, stored, or transmitted in any form or by any name without prior permission in writing from the copyright holder. Special requests should be addressed to editor@kiu.ac.lk

## **Disclaimer**

Facts and opinions in articles published in the International Journal of KIU are solely the personal statements of the respective authors. Authors are responsible for all contents in their article(s) including accuracy of the facts, statements, citing resources, and so on. The International Journal of KIU and its editors disclaim any liability for violations of other parties' rights, or any damage incurred therefore to use or apply any of the contents of the International Journal of KIU. Material submitted to the International Journal of KIU is original and not published or submitted for publication elsewhere.

## **Editorial Board**

### **Chief Editor**

Dr. L. A. C. Sajeewanie

### **Editor**

Mr. Akila Randika Jayamaha

### **Associate Editors**

Prof. Wasantha Seneviratne

Dr. Anoma Edirimanna

Dr. Sunimal Rathnayake

### **Members**

Dr. Indrapala Chandrasekeram

Ms. Nadeeka Ranadeva

Ms. Nirmani Samarakoon

### **Copy Editors**

Ms. Anjalee Indrachapa Karunananda

Ms. Piyumi Nawanjala

### **Secretary**

Ms. A. M. Fabiola Fernando

Ms. Ishara Herath



## Original Article

### Preliminary Evaluation of Photoprotective Potential in Flowers of *Osbeckia octandra* (L.) DC. for Development of Herbal Sunscreen Formulations

Liyanaarachchi C.<sup>1</sup>, Napagoda M.<sup>1\*</sup>, Witharana S.<sup>2</sup>, Jayasinghe L.<sup>3</sup>

<sup>1</sup>Department of Biochemistry, Faculty of Medicine, University of Ruhuna, Galle 80 000, Sri Lanka

<sup>2</sup>Department of Mechanical Engineering, Faculty of Engineering, University of Moratuwa, Moratuwa 10400, Sri Lanka

<sup>3</sup>National Institute of Fundamental Studies, Kandy 20 000, Sri Lanka

#### Abstract

#### Article history:

Received: 29.10.2023

Received in revised form:  
09.12.2023

Accepted: 13.12.2023

Cite as: Liyanaarachchi C., Napagoda M., Witharana S., Jayasinghe L. (2024) Preliminary Evaluation of Photoprotective Potential in Flowers of *Osbeckia octandra*(L.) DC. for Development of Herbal Sunscreen Formulations, International Journal of KIU, 5 (1), 1-9. <https://doi.org/10.37966/ijkiu2024051047> \*Corresponding author: mayurinapagoda@yahoo.com

**Introduction:** Excessive exposure to ultraviolet (UV) radiation of the solar spectrum is often linked with the onset of conditions like inflammation, photoaging, immunosuppression, hyperpigmentation, and photocarcinogenesis. Although synthetic sunscreens have emerged as protectants against this harmful UV radiation, there is an increasing demand for sunscreens of herbal origin, which are believed to have low side-effect profiles in comparison to their synthetic counterparts. In order to cater for this need, the present study aimed at developing herbal sunscreen formulations from flowers of *Osbeckia octandra* DC, a purple-coloured wildflower widely distributed across different geographical regions in Sri Lanka.

**Methodology:** The UV filtering potency and subsequently, the sun protection factor (SPF) in the methanolic extract of *O. octandra* was initially determined. Thereafter this extract was incorporated into the aqueous cream base at 25%, 50%, and 75% (w/w) and the SPF values and photostability of the prepared formulations were evaluated.

**Results:** The initial SPF value of the crude extract ( $39.91 \pm 1.93$ ) had hardly changed even after incorporating it at 75% into the aqueous cream base. This 75% formulation surpassed the other two formulations and the commercial sunscreen (positive control) in terms of the higher SPF and broader spectrum of UV absorption. Its SPF value altered only slightly during the storage for 21 days in light or dark conditions and was photostable.

**Conclusion:** Our preliminary observations demonstrated the appropriateness of *O. octandra* for the formulation of herbal sunscreens at the commercial stage.

**Keywords:** Herbal sunscreens, *Osbeckia octandra*, Photoprotection, Sun protection factor, UV radiation

## Introduction

Life on earth would not be possible without the sun, however; excessive and prolonged exposure to solar radiation is associated with several dermatological problems in humans. The ultraviolet (UV) component of the solar spectrum accounts for electromagnetic radiation with short wavelengths and high energy and is responsible for conditions such as erythema, inflammation, hyperpigmentation as well as photo aging and photocarcinogenesis. Solar UV radiation is divided into three categories; UV-C (100–280 nm), UV-B (280–315 nm), and UV-A (315–400 nm), out of which UV-B and UV-A account for the aforementioned deleterious effects on human skin whereas most devastating UV-C radiation gets completely filtered by the stratospheric ozone layer, hence does not reach earth [1]. However, anthropogenic activities have led to a substantial depletion of the stratospheric ozone level and resulted in a significant increase of the UV radiation reaching the earth and consequently the related dermatological problems [2]. The harmful effects of solar UV radiation on human skin could be avoided or minimized by an innovative approach termed “photoprotection”, which involves various strategies such as avoidance of sun, protection of skin with clothing, and topical or oral application of sunscreens [3].

Topical sunscreens are widely used as protectants against photodamage and are comprised of active ingredients with the ability to reflect or absorb UV rays and thereby reduce the penetration of UV radiation in the skin [3]. However, the presence of multiple chemicals in sunscreen products could trigger allergic responses [4] and particularly the oxybenzone, which is frequently present in synthetic sunscreens has been reported to produce contact and photo contact allergy reactions, implemented as a possible endocrine disruptor and has been linked to Hirschsprung's disease [5]. In view of these adverse effects associated with synthetic sunscreens along with the emergence of the concept of “green

cosmetics”, plant extracts and phytochemicals are receiving increased attention as natural alternatives for synthetic chemical ingredients in sunscreen products [2].

In the quest for natural photoprotective agents, flavonoids would be ideal candidates due to their high UV absorption capability, direct and indirect antioxidant properties, and ability to modulate several signaling pathways [6]. Among the different classes of flavonoids, anthocyanins are considered the main pigments accountable for the colors of many fruits, vegetables, and flowers which are red, blue, and purple [6,7]. On this basis, colorful flowers could be studied as potential sources of natural sunscreen agents. Thus, the present study is carried out to evaluate the photoprotective activity in *Osbeckia octandra* DC., one of the colorful and common wildflowers in Sri Lanka.

*Osbeckia octandra* DC., is native to Sri Lanka and is found as a small shrub in the moist mid and low-country regions of Sri Lanka [8]. The color of the flower varies from pink to mauve or purple. The plant belongs to the family Melastomataceae from which different anthocyanins such as pelargonidin, cyanidin, peonidin, delphinidin, and malvidin glycosides or acyl glycosides have been isolated [9]. Further, *Osbeckia* species are rich in anthocyanin and thus display potent antioxidant activity [10]. In addition, significant antioxidant activity and a high phenolic content were detected in leaf decoctions prepared from *O. octandra* grown in Sri Lanka [11]. Based on this literature evidence, we hypothesized that the flowers of *O. octandra* possess desirable features to be used in the development of natural sunscreen formulations with high UV absorbance capacity and hence, a high sun protection factor (SPF). Initially, the UV-filtering potential of the methanolic extract of the flowers of *O. octandra* was determined, thereafter, this extract was incorporated at different percentages to formulate herbal sunscreens, and the *in vitro* photoprotective potency of these sunscreen formulations was evaluated in this study.

## Methodology

### Plant Material and preparation of extract

Flowers of *O. octandra* were collected from Pasyala, Gampaha District -Western Province of Sri Lanka in 2020 and identified by the author (MN), a botanist. The plant material was authenticated by comparison with the herbarium specimens at the National Herbarium, Royal Botanical Garden, Peradeniya, Sri Lanka. A voucher specimen (MN\_20\_05) was deposited at the Department of Biochemistry, Faculty of Medicine, University of Ruhuna, Sri Lanka.

The flowers were washed with running water to remove the dust and thereafter dried in shade (30 °C) for four days until a constant weight was obtained. Dried plant materials (3.2 g) were cut into small pieces and extracted in 250 mL of methanol (Sigma-Aldrich, Germany). The extract was evaporated into dryness with the use of a rotary evaporator (HS-2005V-N, South Korea).

### Evaluation of UV filtering potential in the methanolic extract of *O. octandra* (MEFO)

The UV filtering potential of the extract was determined following the method described by Napagoda et al. [2] which involved measuring the UV absorption of the extract (1 mg/mL in methanol- denoted as “MEFO”) followed by calculating the sun protection factor (SPF) according to the Mansur equation given below [12].

$$\text{SPF}_{\text{spectrophotometric}} = \text{CF} \times \sum_{290}^{320} \text{EE}(\lambda) \times I(\lambda) \times \text{Abs}(\lambda)$$

where EE ( $\lambda$ ) – erythemal effect spectrum; I ( $\lambda$ ) – solar intensity spectrum; Abs ( $\lambda$ ) – absorbance of sunscreen product; CF – correction factor (=10)

In order to assess whether the initial SPF value of this extract would change under different storage conditions, the extract was exposed to direct

sunlight and also stored in darkness separately for 21 days, and subsequently, the SPF value was calculated on the 7<sup>th</sup>, 14<sup>th</sup> and 21<sup>st</sup> day. The experiment was conducted in triplicates.

### Qualitative analysis for the presence of phenolic compounds in the MEFO

The qualitative tests for the detection of phenolic phytochemical compounds were carried out for the MEFO (1 mg/mL) as per the standard methods [13,14].

#### Test for phenolics

The extract (1 mL) was treated with 3-4 drops of ferric chloride solution and the appearance of a bluish-black color indicated the presence of phenolics

#### Test for flavonoids

The extract (1 mL) was treated with a few drops of NaOH. The appearance of intense yellow color which turns colorless upon the addition of diluted HCl was an indication of the presence of flavonoids.

Additionally, the extract (1 mL) was treated with a few drops of lead acetate solution and the formation of a yellow-colored precipitate was an indication of the presence of flavonoids.

#### Test for anthocyanin

To determine the presence or absence of anthocyanins, 2 N HCl (2 mL) was added to the flower extract (2 mL). The appearance of a pink-red color that turns purplish-blue after the addition of diluted ammonia was considered an indicator of the presence of anthocyanin.

### Determination of total flavonoid content

The method described by Khodaie et al. [15] and modified by Liyanaarchchi et al. [16] was employed for this purpose. The MEFO (1 mg/mL; 500  $\mu$ L) was treated with NaNO<sub>2</sub> (150  $\mu$ L)



and incubated for 5 min and further incubated for 6 min after the addition of 10%  $\text{AlCl}_3$  (150  $\mu\text{L}$ ). Into this reaction mixture, NaOH (2 mL) was added, and the absorbance was measured at 510 nm. A standard curve was plotted following the same procedure using 0.02-1 mg/mL of quercetin solutions in methanol. The total flavonoid content of the extract was calculated according to the calibration curve,  $y=0.0081x-0.0025$  ( $R^2=0.9956$ ) and was expressed in terms of quercetin equivalence in (QUE)/g dry weight (DW) of extract. The experiment was performed in duplicate.

### Formulation of herbal sunscreens and determination of the UV filtering potential

The methanolic extract (i.e. the residue after evaporating methanol) of *O. octandra* was mixed with an aqueous cream base at 25%, 50%, and 75% (w/w). This resulted in three different sunscreen formulations. The UV absorbance measurements of the prepared formulations were obtained, and the SPF was determined on the 7<sup>th</sup>, 14<sup>th</sup>, and 21<sup>st</sup> day after storing under light and dark conditions separately.

A commercial herbal sunscreen formulation containing *Aloe*, Sandlewood, *Ficus* was used as the positive control whereas the aqueous cream base was used as the negative control. The experiment was performed in triplicate.

### Determination of Photostability

The photostability of the sunscreen formulations was determined by the method described by Gonzalez et al. [17] and modified by Liyanaarachchi et al. [16]. In brief, 50 mg of the sample was applied on a 25 cm<sup>2</sup> area of a stainless steel plate, which corresponds to an area density of 2.0 mg/cm<sup>2</sup> [18]. The plates were exposed to natural sunlight for five hours (from 9.30 a.m. to 2.30 p.m.). Control plates of each formulation which have not been exposed to sunlight were also prepared for UV absorption measurements.

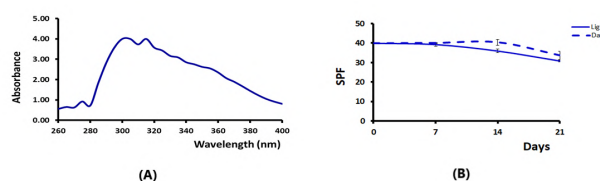
The UV absorbance of each sample was determined in the 290–400 nm range. The commercial herbal sunscreen product and the aqueous cream base were used as the positive control and negative controls respectively. The experiment was performed in duplicate. A curve between absorbance versus wavelength was drawn and the area under the curve (AUC) for total UV spectrum (290–400 nm), UV-A1 (340–400 nm), UV-A2 (320–340 nm), and UV-B (290–320 nm) spectra were calculated for each of the exposed and non-exposed samples. The following equation was used to determine the AUC index (AUCI) where  $\text{AUCI} = \frac{\text{AUC}_{\text{exposed}}}{\text{AUC}_{\text{non-exposed}}}$  and if the AUC index  $\geq 0.8$ , the sunscreen formulation was considered to be photostable [16, 17].

### Results

The high SPF value, a broad spectrum of UV protection, and photostability are accepted as features of an ideal sunscreen [19]. These parameters were evaluated in the present study.

### UV filtering potential in the MEFO

Figure 1(A) shows the UV absorbance of the methanol extract of *O. octandra* at the range of 260-400 nm. This indicates high UV absorbance throughout the range of 290–350 nm with the maximum absorbance within the UV- B range.



**Figure 1: UV filtering potential in methanolic extract of *O. octandra***

**(A) Absorption of UV radiation between 260–400 nm**

**(B) Variation of SPF at different time intervals under light and dark conditions**

The SPF of the MEFO was recorded as  $39.91 \pm 1.93$ . This value varied only slightly

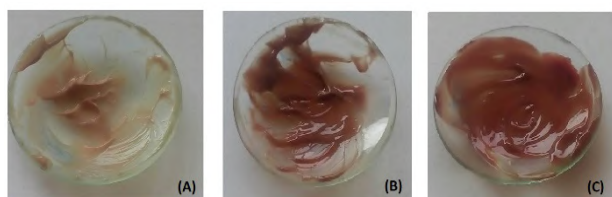
over 21 days as evident from Figure 1 (B). Nevertheless, out of the two samples, the variation of SPF value was higher in the sample that was exposed to sunlight.

### Analysis of the presence of phenolic compounds in the MEFO

Positive results were obtained for all the qualitative phytochemical tests indicating the presence of flavonoids, particularly, anthocyanins in the flower extract while the total flavonoid content in this extract was determined as 20.93 mg (QE)/g. Phenolic secondary metabolites such as flavonoids have been considered effective shielding materials and the anthocyanins present in flower petals are reported to have the ability to effectively screen harmful UV-B radiation [20]. Therefore, the detection of anthocyanin in the flower extract could be correlated to the high UV absorbance observed in Figure 1 (A).

### Formulation of herbal sunscreens and evaluation of UV filtering potential

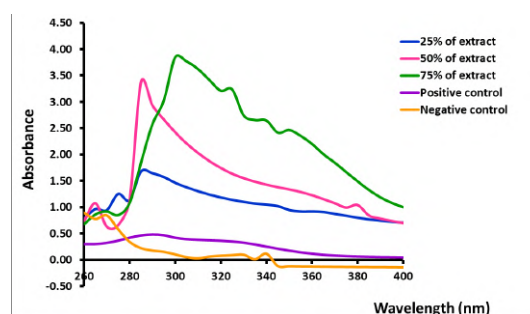
All the sunscreen formulations prepared from the flower extract appeared brown. The color intensity varied depending on the percentage of the extract incorporated in the formulation (Figure 2).



**Figure 2: Sunscreen formulations prepared with (A) 25% (B) 50% and (C) 75% of the methanolic extract of *O. octandra***

Figure 3 illustrates the UV absorbance pattern versus wavelength of sunscreen formulations. In general, all three formulations exhibited the highest UV absorbance in the UV-B range, similar to the original crude extract. However, the UV absorbance was much more conspicuous

in the formulation comprised of 75% of the extract than the other two counterparts. On the other hand, the commercial sunscreen product, which was the positive control, was not capable of absorbing UV radiation effectively, either in UV-B or UV-A regions of the solar spectrum. Moreover, the UV absorbance was negligible in the aqueous cream base which was used as the negative control, indicating an insignificant contribution from the cream base to the high UV absorbance of the formulations prepared from it.

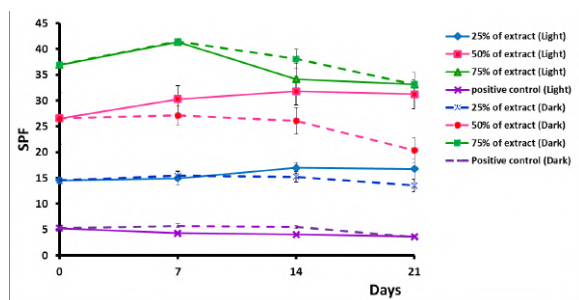


**Figure 3: Absorption of UV radiation between 260–400 nm by sunscreen formulations of *O. octandra* extract, positive control, and negative control**

The initial mean SPF values for the formulations with 25%, 50%, and 75% of the flower extract were recorded as  $14.54 \pm 0.47$ ,  $26.53 \pm 0.54$ , and  $36.89 \pm 0.52$  respectively. This is indicative of the capability of these products to provide good photoprotection from UV radiation. The photoprotective potency in all three formulations outclassed that of the commercial sunscreen product used as the positive control. The SPF value calculated from the absorbance data for the positive control was  $5.25 \pm 0.93$  although it was mentioned as 15 on its label and only about three months have passed since its manufacturing date. This agrees with previous observations that the labelled SPF value of a sunscreen product may not always display its actual SPF value [2, 21].

The variation of SPF values in the three formulations over 21 days did not follow the same pattern (Figure 4). Only a slight reduction of SPF value was observed with time in the formulation with 75% extract under both conditions, in

contrast to the increment of SPF value in the other two formulations when exposed to light. The increment in the SPF value was most prominent in the formulation containing 50% of the extract. On the other hand, the change in the SPF value was insignificant in the positive control.



**Figure 4: Variation of SPF at different time intervals in various strengths of sunscreen formulations of *O. octandra* extract compared with positive control, stored under light and dark conditions**

#### Determination of Photostability

Table 1 presents the AUC index of the different formulations, the positive control, and the negative control. The calculation of the AUC index provided a better insight into the photostability of the prepared sunscreen formulations. The formulations with an AUC index greater or equal to 0.8 were considered photostable [17] and based on these criteria, the formulation comprised 50% of the extract exhibited photo instability throughout the UV range, unlike the formulations with 25% or 75% extract. Yet, its AUC index in the UV-A2 region was better than that of the formulation with 25% extract. The AUC index was almost 0.8 for the formulation containing 75% of the extract. Moreover, the formulation with 25% of the extract was photostable in the total UV range, UV-B, and UV-A1 regions, although this ability was lost in the UV-A2 region. Despite having fairly low UV absorbance values, the positive control exhibited photostability throughout the UV region. On the other hand, the negative control completely lacked photostability, thus the cream base did not contribute to the photostability of

the prepared formulations.

**Table 1: Area under the curve (AUC) index of the herbal sunscreen formulations and the positive and negative controls**

Sample	AUC Index			
	Total spectrum	UV-B	UV-A1	UV-A2
25% of extract	0.87	0.99	0.76	0.17
50% of extract	0.61	0.65	0.56	0.59
75% of extract	0.78	0.78	0.78	0.78
Positive control	0.87	0.89	0.87	0.82
Negative control	0.10	0.11	0.08	0.09

#### Discussion

Sri Lanka is a country located within the equatorial belt, thus receiving a high amount of solar radiation throughout the year, which makes people highly vulnerable to UV-induced skin damage due to extensive exposure to the intense solar radiation [2]. Therefore, the formulation of herbal sunscreen products with high SPF values would be highly beneficial. In this respect, the formulations developed from *O. octandra*, particularly, the formulation containing 75% of the extract are of great significance not merely due to the high SPF value, but also due to its photostability and broad-spectrum sunscreen activity. Normally, sunscreen products are categorized according to their SPF values as minimal (SPF < 12), moderate (SPF 12-30), and high (SPF  $\geq$  30) sun protection products [22]. Our observations demonstrated that the formulation comprised of 75% extract has the potency of a high sun protection product. On the other hand, most commercial sunscreen products are highly effective against UV-B, but not against UV-A, even though the ideal sunscreen should provide good protection throughout the whole UV spectrum [19]. However, the formulation composed of 75% extract displayed a broad spectrum of sun protection by efficiently absorbing the UV radiation between 290–350 nm which covers both UV-B and UV-A regions of the solar spectrum. Another challenge in the cosmetic industry is the development of sunscreens with photostability, as most of the UV filters in sunscreens may degrade or destroy

over time or once exposed to the sun [2]. The photostability displayed by the formulation composed of 75% extract further confirms its suitability to be developed as a potent topical sunscreen on a commercial scale in this aspect too. Prompted by these preliminary observations, our investigations are now focused on enhancing the efficacy of this product via nanotechnological approaches, while further experiments are warranted to evaluate the stability on a long-term basis, possible cytotoxic effects of this formulation *in vitro*, as well as with more clinical facet to ascertain its safety on the normal human skin.

### Conclusion

The preliminary findings of this study reveal that the sunscreen formulations prepared from flowers of *O. octandra* are highly effective as

herbal cosmetics. Especially the formulation containing 75% methanolic extract possesses strong and broad-spectrum UV-filtering ability, high SPF, and photostability highlighting its potential to be developed into herbal cosmetic products of commercial value.

### Acknowledgements

The authors are grateful to Mrs. Shamila Malkanthi and Mrs. Kaumudi Abayawardana, Department of Biochemistry, Faculty of Medicine, University of Ruhuna, Sri Lanka for technical support to conduct this study.

### Conflicts of interest

The authors declare that they have no competing conflict of interest.

### References

- Clydesdale GJ, Dandie GW, Muller HK. Ultraviolet light induced injury: Immunological and inflammatory effects. *Immunology & Cell Biology* 2001; 79: 547–568. 10.1046/j.1440-1711.2001.01047.x
- Napagoda MT, Malkanthi BM, Abayawardana SA, et al. Photoprotective potential in some medicinal plants used to treat skin diseases in Sri Lanka. *BMC Complementary and Alternative Medicine* 2016;16(1): 479. <https://doi.org/10.1186/s12906-016-1455-8>
- Verschooten L, Claerhout S, Van Laethem A, et al. New strategies of photoprotection. *Photochemistry and Photobiology* 2006; 82(4): 1016–1023. <https://doi.org/10.1562/2006-04-27-ir-884.1>
- Chakravarty N, Kellogg C, Alvarez J, et al. UV protection by natural products: *C. myrrha* oil versus sunscreen. *Journal of Drugs in Dermatology* 2018;17(8): 905–907.
- DiNardo JC, Downs CA. Dermatological and environmental toxicological impact of the sunscreen ingredient oxybenzone/benzophenone-3. *Journal of Cosmetic Dermatology* 2018;17(1): 15–19. 10.1111/jocd.12449
- Saewan N, Jimtaisong A. Photoprotection of natural flavonoids. *Journal of Applied Pharmaceutical Science* 2013;3: 129–141.
- Quina FH, Bastos EL. Chemistry inspired by the colors of fruits, flowers and wine. *Anais da Academia Brasileira de Ciencias* 2018; 90(Suppl 1): 681–695. 10.1590/0001-3765201820170492

- Thabrew MI, Gove CD, Hughes RD, et al. Protective effects of *Osbeckiaoctandra* against galactosamine and tert-butyl hydroperoxide induced hepatocyte damage. *Journal of Ethnopharmacology* 1995; 49(2): 69–76. [https://doi.org/10.1016/0378-8741\(95\)90033-0](https://doi.org/10.1016/0378-8741(95)90033-0)
- Serna DM, Martínez JH. Phenolics and polyphenolics from Melastomataceae species. *Molecules* 2015; 20(10): 17818–17847. [10.3390/molecules201017818](https://doi.org/10.3390/molecules201017818)
- Lawarence BKM, Murugan K. Comprehensive evaluation of antioxidant potential of selected *Osbeckia* species and their *in vitro* culture, purification and fractionation. *Pharmacognosy Journal*2017; 9: 674–682.
- Perera PRD, Ekanayaka S, Ranaweera KKDS. *In vitro* study on antiglycation activity, antioxidant activity and phenolic content of *Osbeckiaoctandra* L. leaf decoction. *Journal of Pharmacognosy and Phytochemistry*2013; 2: 198–201.
- Mansur JS, Breder MN, Mansur MC et al. Determination of sun protection factor by spectrophotometry. *Anais Brasileiros de Dermatologia*1986; 61: 121–124.
- Tiwari PK, Kumar B, Kaur M, et al. Phytochemical screening and extraction: A review.*Internationale Pharmaceutica Scientia*2011; 1: 98–106.
- Obouayeba AP, Diarrassouba M, Soumahin EF, et al. Phytochemical analysis, purification and identification of *Hibiscus* anthocyanins. *Journal of Pharmaceutical, Chemical and Biological Sciences* 2015; 3(2):156–168
- Khodaie L, Bamdad S, Delazar A, et al. Antioxidant, total phenol and flavonoid contents of two *Pedicularis* L. species from Eastern Azerbaijan, Iran. *Bioimpacts*2012; 2: 47–53.
- Liyanaarachchi CE, Napagoda M, Malkanthi S, et al. Development of herbal sunscreen formulations from the leaves of Sri Lankan medicinal plants, *Hibiscus furcatus* wild. and *Oloxzeylanica* linn. *Journal of Science Eastern University Sri Lanka*2022; 13(2): 1–12.
- Gonzalez H, Tarras-Wahlberg N, Strömdahl B, et al. Photostability of commercial sunscreens upon sun exposure and irradiation by ultraviolet lamps. *BMC Dermatology* 2007; 7: 1. Doi: [10.1186/1471-5945-7-1](https://doi.org/10.1186/1471-5945-7-1)
- Stokes R, Diffey B. *In vitro* assessment of sunscreen photostability: The effect of radiation source, sunscreen application thickness and substrate. *International Journal of Cosmetic Science*1999; 21: 341–351. [10.1046/j.1467-2494.1999.203163.x](https://doi.org/10.1046/j.1467-2494.1999.203163.x)
- Ho TY. Sunscreens: Is looking at sun protection factor enough? *Hong Kong Dermatology & Venereology Bulletin* 2001; 9: 100–108.
- Mori M, Yoshida K, Ishigaki Y, et al. UV-B protective effect of a polyacylated anthocyanin, HBA, in flower petals of the blue morning glory, *Ipomoea tricolor* cv. Heavenly Blue. *Bioorganic & Medicinal Chemistry* 2005; 13(6): 2015–2020.
- Fonseca AP, Rafaela N. Determination of sun protection factor by UV-Vis spectrophotometry. *Health Care Current Reviews* 2013; 1: 108. [10.4172/2375-4273.1000108](https://doi.org/10.4172/2375-4273.1000108)

Stevanato R, Bertelle M, Fabris S. Photoprotective characteristics of natural antioxidant polyphenols. *Regulatory Toxicology and Pharmacology* 2014; 69(1): 71–77. 10.1016/j.yrtph.2014.02.014



# International Journal of KIU

Journal home page : <https://ij.kiu.ac.lk/>

DOI: <https://doi.org/10.37966/ijkiu2024051048>



## Original Article

### A Literature Review on Motivational Strategies to Elevate Engagement, Effective Communication, and Productivity in English as a Second Language (ESL) Classrooms

Karunananda D.G.A.I.

Department of Languages, KIU, Sri Lanka

#### Abstract

#### Article history:

Received: 21.09.2023

Received in revised form:  
22.01.2024

Accepted: 02.02.2024

Cite as: Karunananda D.G.A.I. (2024)  
A Literature Review on Motivational  
Strategies to Elevate Engagement,  
Effective Communication, and  
Productivity in English as a Second  
Language Classrooms (ESL),  
International Journal of KIU, 5 (1),  
10-16. <https://doi.org/10.37966/ijkiu2024051048>

\*Corresponding author: [anjaleechapa@kiu.ac.lk](mailto:anjaleechapa@kiu.ac.lk)

**Introduction:** English as a Second Language (ESL) proficiency has become vital for global communication and essential in education. On the other hand, motivation, defined as the internal drive to engage with enthusiasm, plays a pivotal role in language acquisition. However, motivating ESL learners is a critical challenge for educators, as English is recognized as an international language with broad applications. Therefore, understanding the importance of motivation is crucial in ESL contexts.

**Objective:** The objective of this review is to examine motivational strategies in ESL classrooms and underscore their significance in enhancing students' enthusiasm, participation, language development, and overall success, with a specific focus on providing ESL educators with valuable tools and insights for effective implementation.

**Methodology:** This review follows a methodical approach including literature search and data extraction. Twenty articles published between 1975 and 2022 were reviewed, that focused on motivation strategies in ESL classrooms.

**Results:** Motivation in ESL classrooms can be categorized as internal or external: instrumental or integrative. Effective motivation strategies include setting clear goals, employing the incentive theory, using awards and rewards, role-plays, integrating technology, and activity-based methods. Additionally, creating a positive classroom climate and offering real-life language experiences also contribute to motivation.

**Conclusion:** Motivation is crucial for ESL learners' success; therefore, it is recommended that educators adopt innovative teaching approaches and deepen their understanding of motivation to inspire students, contributing to enhanced language proficiency.

**Keywords:** English language proficiency, ESL classrooms, Language acquisition, Motivation strategies, Student participation

## **Introduction**

The pursuit of proficiency in English as a Second Language (ESL) is no longer confined to the realm of linguistic expertise; it has evolved into an essential skill for global connectivity and cross-cultural communication. ESL classrooms serve as crucibles where learners embark on a transformative journey towards language mastery, but this journey is not without challenges. One of the fundamental challenges educators face is fostering and sustaining learner motivation.

According to Altun and Khdir (2022), ESL is employed in classrooms to enhance students' performance on the global stage. English holds the status of being the international language, making it a dominant language across the world (Alfahad, 2021). It is widely comprehensible, readable, and writable, and serves as a means of communication on every continent. Over time, English has gained significant importance as it is utilized in national and international assessments and various recruitment processes, making it a vital consideration in many countries (Wei, 2019). As noted by Li (2020), the global influence of English in communication and usage underscores its necessity as a second language in the educational journey of students.

Statista's 2021 data demonstrates that English holds a prominent position as a global communication language. It ranks at the top of the list as a secondary language for worldwide communication. The key to improving learners' performance and helping them excel in new language courses lies in motivation. Learners should not underestimate the significance of embracing another language like English, as it can have a profound impact on their ability to attain new goals and derive various benefits (Cave et al., 2018). English has gradually expanded its reach across the globe, becoming one of the most influential languages in the contemporary era. As per Rao (2019), English has continually advanced across continents,

experiencing rapid growth and establishing itself as a Lingua Franca, predominantly spoken in nearly all continents. It has become a universal language for communication through reading, writing, and speaking in many countries, which is why ESL is the preferred choice for language learners in most parts of the world.

Motivation, a universally recognized practice within all types of classrooms, serves as an invaluable aid in encouraging learning and promoting healthy competition among students. It can be described as the inner drive that encourages individuals to actively engage in a specific task with enthusiasm and dedication (Dedo & Hashim, 2019). It is a positive quality that not only enhances work efficiency but also enables learners to derive greater benefits from their activities. Motivation serves as a means by which learners can expand their horizons and progress with a strong sense of enthusiasm and determination. In essence, motivation is a crucial factor for achieving success in any endeavour (Shakir, 2021). It has the potential to accelerate the learning process and improve the performance of learners significantly. When it comes to acquiring a new language such as English, motivation is a fundamental prerequisite for learners, particularly for those who consider English as a secondary language. Motivation plays a vital role in facilitating better language acquisition and performance by steering learners towards a focused approach rather than taking language learning for granted (Wei, 2019). It enhances the learning experience and underscores the value of mastering the language. Motivation empowers students to evaluate the significance of acquiring a new language and keeps their enthusiasm alive.

The international importance of English is undeniable, as highlighted by Wei in 2019. In this context, the tool motivation plays a pivotal role in supporting this endeavour. Moreover, as highlighted by Lai and Chang (2021), motivation plays a pivotal role in shaping policies and principles that aim to enhance student participation and overall learning outcomes as it holds immense significance in acquiring a new



language. Teachers and researchers must delve into the underlying factors that drive motivation in individuals while formulating strategies to foster growth within ESL classrooms.

Accordingly, the objective of this article is to explore and review various motivational strategies used in ESL classrooms. The article aims to highlight the importance of motivation in ESL learning and how it can impact students' enthusiasm, active participation, language development, and overall success. It also discusses different types of motivation, such as internal, external, instrumental, and integrative, and provides insights into effective strategies for enhancing motivation among ESL learners. The goal is to provide ESL educators with valuable tools and insights to inspire students, increase participation, facilitate interaction, and enhance language development in ESL classrooms in the context of the global significance of English language skills.

### **Methodology**

This review article follows a methodical approach to explore the topic of motivation in ESL classrooms. It begins with a search of existing literature, aiming to provide an understanding of various motivation strategies in second language learning. The steps taken to review include literature searches, data extraction, analysis, and organization. Relevant studies were chosen based on specific inclusion criteria, such as being published in peer-reviewed journals, books, or conference proceedings. The literature search involved searching Google Scholar, Research Gate, and Academia using keywords like "ESL classroom motivation," "theories of motivation," and "second language learning motivation." Twenty articles published between 1975 and 2022 were considered to ensure a comprehensive examination of contemporary literature. Selected articles were reviewed, with essential information extracted including primary motivation strategies. This data was then organized to produce a coherent paper.

### **Discussion**

#### *Motivation in ESL Classrooms*

Motivation can be categorized into two types: internal and external. According to Yaccob and Yunus (2019), internal motivation is driven by factors that enhance language learning as a personal preference, motivated by the satisfaction of achieving internal targets and goals. In contrast, external motivation involves goals like obtaining a job or a scholarship upon mastering the English language by the end of the course (Devarajoo & Yamat, 2021). Motivation can also be further divided into instrumental and integration types (Weda, 2018). Instrumental and integration focuses on using the acquired language skills for specific purposes in the future. For instance, a motivated student might enroll in a course to secure a scholarship, but they may also view English as an instrumental motivation since it can improve their chances of getting a job in the future. In contrast, integrated motivation involves being motivated to use a single language for multiple purposes simultaneously (Htun, 2019). In all situations, it is recognized that motivation plays a crucial role in ESL classrooms.

#### *Motivation Strategies for ESL*

Motivation strategies, as described by Cave et al. (2018), are effective practices that can stimulate and boost motivation within the ESL classroom environment. Li (2018) evaluated some of these strategies, including methods to spark interest, encouraging active learning techniques, and promoting language experiences beyond the confines of the ESL classroom. Boosting productivity in ESL classrooms is essential to ensure that English Language Learners (ELL) are motivated and eager to acquire knowledge of the English Language. English is now considered highly valuable on the global stage (Shakir, 2021). However, since the English language is often considered non-compulsory for university students, their interest in acquiring it is limited (Htun, 2019). This lack of interest

and motivation can significantly diminish the effectiveness of English language courses, ultimately resulting in minimal or no learning in the classroom (Alghonaim, 2021). One effective approach to fostering productivity could involve considering the use of awards and rewards as motivational tools, aiming to engage and inspire students to focus on their productivity. Inside classrooms, it is common to observe both general and specific assessments of motor skills and planning, as suggested by Devarajoo and Yamat in 2021. In their 2019 study, Yaccob and Yunus examined the incentive theory of learning, which revolves around the idea of aligning learning with anticipated outcomes. According to this theory, learners are highly motivated to remain engaged and apply their skills when they expect to receive rewards and attain positive performance levels. Essentially, it suggests that factors like rewards, awards, incentives, or any form of positive encouragement can significantly enhance a learner's concentration and commitment to completing tasks, whether it is within or even before the specified time frame. Elevated expectations and judiciously applied rewards serve as potent external motivators to inspire students in their English language learning, according to the theory of extrinsic motivation. Occasionally, as suggested by Freeman and Freeman in 1978, our preconceived notions about individuals prompt us to interact with them in a manner that elicits responses aligned with our initial expectations.

Setting clear goals is paramount when embarking on the journey of learning a second language. Without well-defined objectives, effective language acquisition becomes elusive (Dedo, & Hashim, 2019). Learners must align their efforts with specific targets, ensuring that their progress remains on track. Another theory of learning, known as expectancy theory, as discussed by Wei (2019), underscores the importance of step-by-step learning. It emphasizes that learners are aware that greater effort in learning will result in more support and gain (Dedo, & Hashim, 2019). For instance, when a teacher expresses, "I

believe each of you has the capability to tackle these challenges through effort. Now, let's begin, and I'll assist if you encounter difficulties," they not only convey emotional support but also exhibit confidence in their students' abilities (Altun & Khadir, 2022). Consequently, even the most introverted and reticent students are encouraged to confront challenges with determination, spurred on by these expectations. Nevertheless, this support is gained when learners achieve their goals, but it is crucial to recognize the limitations as well (Alghonaim, 2021). Khaydarova (2020) explored strategies for sparking students' interest both inside and outside the classroom. If students are more inclined towards using technology, the teacher can incorporate IT tools into English learning. Conversely, if drama and music appeal to the class, the teacher can emphasize these methods. Role-play activities are also valuable tools in language classrooms, as they improve learners' discourse and overall performance (Altun, 2015). The approach to sparking interest should align with the capabilities and comprehension levels of the class. Role plays, singing songs, and English camps are also effective methods as students' progress to higher grades, engaging in real-life discussions, and creativity are encouraged. Diversifying and making activities interesting encourages students to invest as much time and effort as possible, boosting their motivation and enhancing their learning experiences (Yacob & Yunus, 2019). According to Ng and Ng (2015), activity-based methods are effective in developing students' interest in ESL classrooms. These physical activities help break the ice and enable students to apply their learning tools and practical skills. Varied categories of activities enhance communication, boost confidence, and facilitate learning. Once interest is aroused, the motivation process naturally follows.

Games are motivating because they are both entertaining and challenging, and incorporate meaningful and practical language within real-life contexts. Well-selected games serve as valuable breaks for students while enabling them to practice language skills. They also foster

collaboration among students. Practical and captivating activities such as guessing games, gap-filling exercises, and chain story games are beneficial for English learning. While certain teaching techniques have already been put into practice, there exists a broader array of options and strategies available to educators for igniting students' innate drive to learn. These options encompass contemporary methods such as Computer Assisted Language Learning (CALL), multimedia resources, internet utilization, and educational software. These techniques are pioneering, engaging, pragmatic, and productive, and incorporate vibrant visuals, captivating audio, abundant information, and effective interaction. Similarly, climate plays a crucial role as it sets the stage for fostering motivation and achievement (Richards & Theodore, 1988). When considering Maslow's hierarchy of needs in the context of English language learning, it becomes evident that creating a relaxed and positive learning environment is essential for students. Also, overly difficult tasks can discourage students, while overly simple tasks may lead to boredom and diminished feelings of competence and self-efficacy (Chundiao, 1990, p.460).

Motivation can also extend beyond the classroom through language experience practice. This method supports motivation by providing learners with opportunities to apply their language skills in real-life situations (Cave et al., 2018). To effectively implement these strategies, it is essential to provide suitable tools both within and outside the classroom, as emphasised by Yamat (2021). This approach not only enhances the classroom learning environment but also extends its impact beyond the classroom, contributing to a comprehensive ESL classroom planning process. Motivation directly influences the level of engagement and participation exhibited by students in ESL classrooms and as Rao (2019) acknowledges, is instrumental in fostering global communication and relevance. With 1.35 billion people worldwide speaking English, participation naturally increases because of motivation in ESL classes. There exists a clear

correlation between motivation and student engagement, with increased motivation leading to higher levels of participation, and conversely, decreased motivation resulting in reduced engagement (Alghonaim, 2001). However, it is important to note that motivation is not a one-size-fits-all concept and cannot be readily handed to students. Instead, educators need to utilize a diverse range of tools and approaches to nurture motivation within the classroom. The learner can attain high scores through proper and enthusiastic learning efforts (Cave et al., 2018). This achievement can distinguish the learner within their peer group and lead to superior performance. Competition can be a motivational instrument within the classroom, driving students to perform efficiently (Cave et al., 2018). Announcements of competition results can serve as effective motivation tools (Alghonaim, 2021). Competition plays a crucial role in this, ensuring higher participation and success rates (Devarajoo & Yamat, 2021). On the other hand, collaborative activities are highly effective in creating a secure environment for students, fostering their engagement, and promoting optimal learning. Research conducted by Hamachek (1972) consistently demonstrates that success tends to inspire students to set higher goals, while failure tends to discourage them. For example, teachers can allocate five minutes in each class for the "I am a teacher today" activity. During this time, students switch roles and become teachers, instructing their peers in English. This activity provides a sense of accomplishment as students have the autonomy to decide what they want to teach, whether it is reviewing previous lessons, introducing new vocabulary, or narrating a story. By taking these steps, the foundation is laid for a student community that is both empowered and driven, nurturing a constructive educational atmosphere that encourages ongoing progress and success.

---

## Conclusion

The article emphasizes the critical importance of motivation in ESL classrooms, highlighting its role in facilitating English language learning, boosting confidence, encouraging participation, and enhancing production. The motivation of students is seen as a key driver of success, especially in the context of increased demand for English language proficiency in Sri Lanka due to the need for migration to a developed country

after the economic crisis. The article suggests that teachers play a role similar to “salespeople,” convincing and persuading students of the value of English learning. To attain this goal, educators are urged to enhance their comprehension of educational psychology, with a specific focus on motivation, and to utilize effective teaching techniques. Simultaneously, they are encouraged to innovate and develop fresh approaches aimed at motivating and sustaining students throughout their journey in learning the English language.

---

## References

- Alfahad, R.M. (2021). Gamifying the CREW: Effects of collaborative responsive writing using gamification. *L2 International Students' Motivation and Academic Vocabulary Achievement*.
- Alghonaim, A.S. (2021). Intrinsic motivation and speech production in Saudi EFL college students. *Journal of Psycholinguistic Research*, 50(5), 1137-1157.
- Altun, M., & Khdhir, S.A. (2022). Arousing students: Motivation in ESL classrooms; Increasing and enhancing participation, interaction and production. *International Journal of Social Sciences and Educational Studies*, 9(2), 111-123.
- Cave, P.N., Evans, N.W., Dewey, D.P., & Hartshorn, K.J. (2018). Motivational partnerships: Increasing ESL student self-efficacy. *ELT Journal*, 72(1), 83-96.
- Chundiao, H. (1990). *The English Teaching and Learning Methods*. Higher Education Press.
- Dedo, S.F., & Hashim, H. (2019). Interactive ICT language games in encouraging active learning among the suburban ESL learners. *International Journal of Academic Research in Business and Social Sciences*, 9(12).
- Devarajoo, H., & Yamat, H. (2021). Exploring the effectiveness of audacity readers' theatre in increasing reading motivation and fluency among lower primary ESL learners. *International Journal of English Language Studies*, 3(2), 120-130.
- Freeman, D. & Freeman, Y.S. (1978). *A Road to Success for Language*. Oxford University Press.
- Gautam, K.K. (1988). *English Language Teaching: A critical study of methods and approaches*. New Delhi: Harman.
- Htun, T.N. (2019). Enhancing students' motivation in literature classrooms. *Mandalay University of Foreign Languages Research Journal*, 10(1), 57-62.
- Khaydarova, R.S. (2020). The importance of motivation and some special tips to arouse students' motivation in English teaching. *Theoretical & Applied Science*, 6, 341-347.
- Lai, J.Y., & Chang, L.T. (2021). Impacts of augmented reality apps on first graders' motivation and performance in English vocabulary learning. *SAGE Open*, 11(4), 21-34.
- Li, M. (2020). Multimodal pedagogy in TESOL teacher education: Students' perspectives. 94, 10-23.

- 
- Ng, C.F., & Ng, P.K. (2015). A review of intrinsic and extrinsic motivations of ESL learners. *International Journal of Languages, Literature and Linguistics*, 1(2), 98-105.
- Rao, P.S. (2019). The role of English as a global language. *Research Journal of English*, 4(1), 65-79.
- Richards, J. C. & Theodore, S. R. (1988). *Approaches and Methods in Language Teaching*. Cambridge University Press.
- Shakir, M. (2021). Relationship between teachers' non-verbal immediacy behaviours and students' motivation: An evidence from Pakistani ESL classrooms. *The Journal of Humanities & Social Sciences, Faculty of Arts and Humanities*, 29(1), 43-58.
- Statista (2021). <https://www.statista.com/statistics/266808/the-most-spoken-languages-worldwide/> Retrieved on February 4, 2023.
- Weda, S. (2018). The Effects of students' motivation and family socioeconomic status on English academic achievement. *The Asian EFL Journal*, 20(12), 132-145.
- Wei, Z.H.O.U. (2019). Development and application of quiz activity-based teaching strategy in English as a Second Language (ESL) classroom in a Japanese university, (17), 29-34.
- Yaccob, N.S., & Yunus, M.M. (2019). Language games in teaching and learning English grammar: A literature review. *Arab World English Journal*, 10(1), 209-217.



## Original Article

### The Quality of Life and Perceived Level of Stress among Mothers of Children with Congenital Heart Disease, in Sri Lanka

Jayasinghe J. P. A. D.<sup>1</sup>, Jayasekara C. P. D.<sup>1</sup>, Pushpamali H. D. A. U.<sup>1</sup>, Fernando C. A.<sup>2</sup>, Jayamaha A. R.<sup>2</sup>, Dharmarathna H. H. N. D.<sup>1\*</sup>

<sup>1</sup>Faculty of Nursing, KIU, Sri Lanka

<sup>2</sup>Research and Innovation Division, KIU, Sri Lanka

#### Abstract

#### Article history:

Received: 02.02.2024

Received in revised form:  
30.04.2024

Accepted: 20.05.2024

Cite as: Jayasinghe J. P. A. D., Jayasekara C. P. D., Pushpamali H. D. A. U., Fernando C. A., Jayamaha A. R., Dharmarathna H. H. N. D. (2024) The Quality of Life and Perceived Level of Stress among Mothers of Children with Congenital Heart Disease, in Sri Lanka, International Journal of KIU, 5 (1), 17-23. <https://doi.org/10.37966/ijkiu2024051049>

\*Corresponding author: [nishadi@kiu.ac.lk](mailto:nishadi@kiu.ac.lk)

**Introduction:** Congenital Heart Disease (CHD) is the most common among all congenital defects, with Asia reporting the highest prevalence. The experience of having a child with CHD can induce stress levels and significantly compromise the quality of life (QOL) of the parents.

**Objective:** To determine the quality of life and perceived level of stress among mothers of children with congenital heart diseases, in Sri Lanka.

**Methodology:** A descriptive cross-sectional study was conducted among randomly selected 75 mothers who sought treatment for a child with CHD at the cardiology clinic of Lady Ridgeway Hospital for Children, Sri Lanka. The QOL was measured using the Brief Version of the World Health Organization Quality of Life (WHOQOL-BREF) scale, while the level of stress was measured using the Perceived Stress Scale (PSS). Data were analysed using both descriptive and inferential statistics via IBM SPSS version 25. Ethical approval was obtained from the Ethics Review Committee of KIU (KIU/ERC/19/42).

**Results:** Among the participants, most of the mothers were Sinhalese (n=64, 85%) and Buddhists (n=55, 73%). Nearly half of the respondents (n=39, 52%) had education up to senior secondary level (G.C.E. O/L). Most of the participants were married (n=66, 88%) and unemployed (n=43, 57%). Only 29% (n=22) reported their QOL was at a good level, and 41% (n=31) were neither satisfied nor dissatisfied with their general health. Also, 67% of them (n=50) experienced moderate perceived stress. Further, the physical health domain (p≤0.001), psychological domain (p=0.004), social relationship domain (p≤0.001) and environment domain (p=0.001) of QOL were significantly associated with perceived stress levels.

**Conclusion:** Most mothers of children with CHD exhibited poor QOL and experienced high levels of perceived stress. Perceived stress demonstrates a significant association with physical, psychological, social relationships, and environmental QOL domains. In that context, interventions aimed at enhancing QOL and mitigating stress levels should be implemented for mothers of children with CHD.

**Keywords:** Children, Congenital heart diseases, Mothers, Perceived stress, Quality of life

## **Introduction**

Congenital heart diseases (CHD) are among the most common types of birth defects, contributing to almost one-third of all major congenital abnormalities. There has been a substantial increase in the birth prevalence of children with CHD, particularly in Asia, reporting the highest CHD birth prevalence reaching 9.3 per 1,000 live births (Van et al., 2011) and more than 250,000 deaths have occurred due to CHD globally in 2017 (Kassebaum et al., 2020). According to the reports by Wickramasinghe et al. (2001), over 3,000 children are born with CHD in Sri Lanka each year. Consequently, the birth of a child with CHD poses a distressing experience for many parents. In such circumstances, both fathers and mothers respond differently, while showing varying levels of anxiety. However, it is often observed that mothers are more profoundly affected by their child's illnesses than fathers (Yildiz, Celebioglu & Olgun, 2009). As a result, mothers may experience both physical and mental challenges (Farzad, 2018). It is believed that mothers of children with CHD have a poor quality of life (QOL) in comparison to mothers of children with other illnesses (Sileshi & Tefera, 2017). For instance, a study by Uzark and Jones (2003) found that approximately 1 in 5 parents, particularly mothers of children with CHD, expressed clinically significant levels of stress.

The QOL can be defined as the multidimensional concept that encompasses various aspects of an individual's well-being and overall satisfaction with life, such as physical, psychological, social, and environmental components. In this interpretation, physical health pertains to the condition of the body, psychological health encompasses mental and emotional well-being, social health involves relationships and community ties, whilst environmental well-being involves harmony between individuals and their surroundings (Martinez et al., 2012).

According to the definition provided by the World Health Organization (WHO, 1997), QOL is the perception of an individual's position

in life within the culture and value systems of their surroundings. These mainly include goals, expectations, and standards. Not surprisingly, the QOL of parents of children with CHD is influenced by various factors, primarily including the clinical status of the child, psychological status, social support (Arafa et al., 2008), educational level, marital status, number of children, income, and type of heart disease (Warnakulasooriya & Kasturiaratchi, 2020).

The responsibility of caring for a child with CHD significantly affects the mother's QOL and stress level. This provides insights on QOL and stress experienced by parents which can be utilised to improve the well-being of parents with such children. The gap in the literature in the context of Sri Lanka underscores the need for the study. Therefore, the purpose of the study is to determine the QOL and perceived level of stress among mothers of children with CHD at Lady Ridgeway Hospital, Sri Lanka.

## **Methodology**

A descriptive cross-sectional study was conducted among 75 mothers of children with CHD who attended the cardiology clinic in Lady Ridgeway Hospital (LRH), Colombo, Sri Lanka, from August 2019 to November 2019. Ethical approval was obtained from both Ethics Review Committees (ERC) of KIU (KIU/ERC/19/42) and LRH, Sri Lanka. Study participants were interviewed by trained investigators using an interviewer-administered questionnaire. The questionnaire was pre-tested with 10 mothers of children with CHD who attended the cardiology clinic in LRH. Based on the feedback received, the pre-tested questionnaire was modified. Pregnant mothers and mothers with critically ill children were excluded from the study. The socio-demographic characteristics evaluated in the questionnaire included age, race, religion, education, marital status, and economic status.

QOL was assessed using the World Health Organization Quality of Life Brief Version (WHOQOL-BREF). The WHOQOL-BREF

is a shorter version of the original instrument, designed for use in large research studies or clinical trials. It comprises 26 items that measure broad domains including physical health, psychological health, social relationships, and environment (WHO, 1996). A validated version of WHOQOL-BREF for the Sri Lankan context was used in this study (Cronbach's alpha > 0.7 for all domains) (Kumarapeli, Seneviratne & Wijeyaratne, 2006). The QOL scores were rated on a 0-100 scale, with scores equal to or less than 45 considered low, scores between 46-65 considered moderate, and scores above 65 indicating high QOL. The 1<sup>st</sup> two questions addressed the participants' perceived overall QOL and general health.

Perceived Stress Scale (PSS) is a valid and reliable instrument (Berardi et al., 2021) to assess the level of stress (Chan & La Greca, 2020). Scores ranging from 0-13, 14-26, and 27- 40 were respectively considered as low, moderate, and high perceived stress (Cohen et al., 1983). Data analysis was performed using appropriate descriptive and inferential statistics. The association between perceived stress and levels of the four domains of QOL was evaluated using the chi-square test. Statistical significance was at p-value < 0.05. Data were analysed using IBM Statistical Package for Social Science (SPSS 25) version 25.

## Results

### *Demographic characteristics of the participants*

The majority of the mothers were Sinhala (n=64, 85%) and Buddhists (n=55, 73%). Nearly, half (n=39, 52%) of the respondents were educated up to senior secondary level (G.C.E. O/L). A significant proportion of the participants were married (n=66, 88%) and the majority were unemployed (n=43, 57%) (Table 1).

Table 1: Demographic characteristics of the participants

Characteristics	Frequency	Percentage %
<b>Age</b>		
19 ≤	1	1.3
20 – 29	8	10.7
30 – 34	27	36.0
35 – 39	21	28.0
40 ≥	18	24.0
<b>Religion</b>		
Buddhist	55	73.3
Catholic	12	16.0
Hindu	8	10.7
<b>Race</b>		
Sinhala	64	85.7
Tamil	11	14.3
<b>Marital Status</b>		
Married	66	88.0
Unmarried	9	12.0
<b>Education Level</b>		
Up to O/L	39	52.0
Up to A/L	30	40.0
Diploma	4	5.3
Degree	1	1.3
Postgraduate	1	1.3
<b>Working Status</b>		
Unemployed	43	57.3
Self-employed	10	13.3
Privet sector employee	12	16.0
Government employee	10	13.3
<b>Health Problems</b>		
Yes	11	14.7
No	64	85.3

### **The quality of life of the participants.**

Out of all the participants, only 29% of the mothers (n=22) reported that their QOL was good. Additionally, less than half of the mothers (n=35, 47%) expressed satisfaction with their overall health. Table 2 displays the perceived overall QOL and general health of the mothers of children with CHD.

### *Domains of quality of life of the participants*

Approximately, half of the mothers had good physical health (n=41, 55%) and social relationships (n=32, 43%). Only 32% (n=24) of mothers of children with CHD reported good psychological health, and 28% (n=21) reported good environmental health (Table 2).



Table 2: QOL and general health

Characteristics	Frequency	Percentage (%)
Perceived Overall QOL		
Very poor	3	4.0
Poor	20	26.7
Neither poor nor good	30	40.0
Good	17	22.7
Very good	5	6.6
Perceived General Health		
Very dissatisfied	1	1.3
Dissatisfied	8	10.7
Neither satisfied nor dissatisfied	31	41.3
Satisfied	27	36.0
Very satisfied	8	10.7
Physical health domain		
Poor	12	16.0
Average	22	29.3
Good	41	54.7
Psychological health domain		
Poor	23	30.7
Average	28	37.3
Good	24	32.0
Social relationships domain		
Poor	15	20.0
Average	28	37.3
Good	32	42.7
Environment domain		
Poor	27	36.0
Average	27	36.0
Good	21	28.0

Level of stress of mothers of children with CHD

### Level of stress of mothers of children with CHD

The findings revealed that 67% (n=50) of the mothers of children with CHD experienced moderate perceived stress. Figure 1 shows the distribution of stress levels among these mothers.

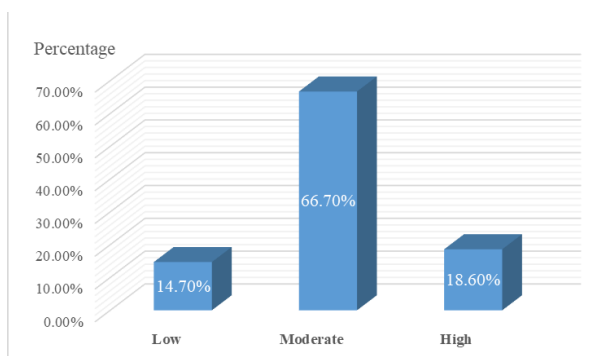


Figure 1: Level of stress of mothers of children with CHD

A significant association was observed between stress levels and QOL among mothers of children with CHD in the physical health domain ( $p \leq 0.001$ ), psychological domain ( $p = 0.004$ ), social relationship domain ( $p \leq 0.001$ ), and environmental domain ( $p = 0.004$ ).

### Discussion

Mothers of children with CHD in this study exhibited poor QOL and experienced high levels of perceived stress. A significant portion of the participants did not indicate an overall satisfactory level of QOL, aligning with findings from studies in both developed countries like Switzerland (Ehrler et al., 2023) and developing countries like Africa (Sileshi & Tefera, 2017a) and Iran (Sanayeh et al., 2021). This indicates that caring for a child with CHD has a distinct impact on parental well-being, likely due to emotional stress stemming from concerns about their child's health, frequent hospital visits, surgeries, and fear of the future. The responsibilities associated with caregiving, particularly for a child with complex medical requirements, can result in both physical and emotional exhaustion.

Consistent with the findings of this study, a report from Egypt by Arafa et al. (2008) revealed a notable decline in QOL among parents of children diagnosed with CHD compared to those with minor illnesses (Arafa et al., 2008). Similarly, Swedish parents of children with CHD reported lower QOL in comparison to parents of children with other diseases (Lawoko & Soares, 2003).

The preliminary finding of this study highlights a significant association between the participants' stress levels and various sub-domains of QOL: physical, psychological, social, and environmental. Confirming the findings of our study Parsaei et al. (2020) reported that stress affects different aspects of an individual's quality of life. For instance, Hachenberger et al. (2023) mentioned the correlation between stress and physical health issues such as cardiovascular problems, weakened immune systems, and gastrointestinal disorders, which can impact QOL. Stress is also closely linked to, mental health, potentially leading to conditions like anxiety and depression, which significantly impact an individual's ability to function and maintain relationships (Ribeiro et al., 2018).

Further, stress can lead to social withdrawal and a decreased ability to cope with social situations, negatively impacting an individual's social support network, crucial for overall QOL (Schneiderman et al., 2005).

A study conducted in Sweden revealed that mothers, in comparison to fathers, reported lower QOL scores across social, physical, and psychological aspects (Lawoko & Soares, 2003) when caring for children with heart diseases. This evidence highlights the fact that mothers bear a higher burden of responsibilities and caregiving tasks for sick children, contributing to lower health well-being. However, research suggests that the psychological stress and diminished QOL of mothers may persist long after the child has received corrective treatment (Ehrler et al., 2023). Given these circumstances, increasing awareness about disease management and treatment options among these mothers could

potentially reduce stress and promote well-being and healthcare professionals also play a crucial role in providing comprehensive and supportive care for the entire family, especially mothers, both before and after their child undergoes treatment for CHD.

## Conclusion

The current study highlights that the mothers of children with CHD experience strain on their psychological, social, and environmental well-being, although physical health remains relatively unaffected. These four aspects of QOL are linked with perceived stress levels. Additionally, providing access to support networks and resources can bolster mothers' resilience and coping strategies, fostering a sense of community and shared experiences that can alleviate stress and promote overall well-being.

## References

- Arafa, M. A., Zaher, S. R., El-Dowaty, A. A., & Moneeb, D. E. (2008). Quality of life among parents of children with heart disease. *Health and Quality of Life Outcomes*, 6, 1–7. <https://doi.org/10.1186/1477-7525-6-91>
- Berardi, A., Ruotolo, I., Sellitto, G., Panuccio, F., Polimeni, A., Valente, D., Tofani, M., & Galeoto, G. (2021). Criterion Validity and Reliability of Perceived Stress Scale (Pss) in a Student Population During Covid-19 Pandemic. *18th International Conference on Cognition and Exploratory Learning in Digital Age, CELDA 2021, 2019(Celda)*, 71–78. [https://doi.org/10.33965/celda2021\\_2021081009](https://doi.org/10.33965/celda2021_2021081009)
- Chan, S. F., & La Greca, A. M. (2020). Perceived Stress Scale (PSS). *Encyclopedia of Behavioral Medicine*, 1646–1648. [https://doi.org/10.1007/978-3-030-39903-0\\_773](https://doi.org/10.1007/978-3-030-39903-0_773)
- Ehrler, M., Wettach, C., Beck, I., Valsangiacomo Buechel, E. R., Latal, B., & Landolt, M. A. (2023). Mental health-related quality of life in mothers of children with surgically repaired congenital heart disease: a 13-year longitudinal study. *Quality of Life Research*, 32(10), 2975–2986. <https://doi.org/10.1007/s11136-023-03440-y>
- Farzad, M. (2018). Quality of Life and Happiness among Mothers of Children with Congenital Heart Disease and Mothers of Healthy Children. *Pediatrics & Neonatal Biology Open Access*, 3(1), 1–5. <https://doi.org/10.23880/pnboa-16000115>
- Hachenberger, J., Teuber, Z., Li, Y. M., Abkai, L., Wild, E., & Lemola, S. (2023). Investigating associations between physical activity, stress experience, and affective well-being during an examination period using experience sampling and accelerometry. *Scientific Reports*, 13(1), 1–10. <https://doi.org/10.1038/s41598-023-35987-8>

- Kumarapeli, V., Seneviratne, R. de A., & Wijeyaratne, C. N. (2006). Validation of WHOQOL-BREF to measure quality of life among women with polycystic ovary syndrome. *Journal of the College of Community Physicians of Sri Lanka*. <https://doi.org/10.4038/jccpsl.v11i2.8252>
- Lawoko, S., & Soares, J. J. F. (2003). Quality of life among parents of children with congenital heart disease, parents of children with other diseases and parents of healthy children. *Quality of Life Research*, 12(6), 655–666. <https://doi.org/10.1023/A:1025114331419>
- Martinez-Martin, P., Prieto-Flores, M. E., Forjaz, M. J., Fernandez-Mayoralas, G., Rojo-Perez, F., Rojo, J. M., & Ayala, A. (2012). Components and determinants of quality of life in community-dwelling older adults. *European Journal of Ageing*, 9(3), 255–263. <https://doi.org/10.1007/s10433-012-0232-x>
- Parsaei, R., Roohafza, H., Feizi, A., Sadeghi, M., & Sarrafzadegan, N. (2020). How Different Stressors Affect Quality of Life: An Application of Multilevel Latent Class Analysis on a Large Sample of Industrial Employees. *Risk Management and Healthcare Policy*, 13, 1261–1270. <https://doi.org/10.2147/RMHP.S256800>
- Ribeiro, Í. J. S., Pereira, R., Freire, I. V, de Oliveira, B. G., Casotti, C. A., & Boery, E. N. (2018). Stress and Quality of Life Among University Students: A Systematic Literature Review. *Health Professions Education*, 4(2), 70–77. <https://doi.org/https://doi.org/10.1016/j.hpe.2017.03.002>
- Sanayeh, M., Nourian, M., Tajalli, S., Khoshnavay F. F., Heidari, A., & Nasiri, M. (2021). Resilience and Associated Factors in Mothers of Children with Congenital Heart Disease: A Cross-Sectional Study. *International Journal of Community Based Nursing and Midwifery*, 9(4), 336–345. <https://doi.org/10.30476/ijcbnm.2021.89691.1630>
- Schneiderman, N., Ironson, G., & Siegel, S. D. (2005). Stress and health: psychological, behavioral, and biological determinants. *Annual Review of Clinical Psychology*, 1, 607–628. <https://doi.org/10.1146/annurev.clinpsy.1.102803.144141>
- Sileshi, L., & Tefera, E. (2017a). Health-related quality of life of mothers of children with congenital heart disease in a sub-Saharan setting: cross-sectional comparative study. *BMC Research Notes*, 10(1), 513. <https://doi.org/10.1186/s13104-017-2856-6>
- Sileshi, L., & Tefera, E. (2017b). Health-related quality of life of mothers of children with congenital heart disease in a sub-Saharan setting: Cross-sectional comparative study. *BMC Research Notes*, 10(1), 1–5. <https://doi.org/10.1186/s13104-017-2856-6>
- Van Der Linde, D., Konings, E. E. M., Slager, M. A., Witsenburg, M., Helbing, W. A., Takkenberg, J. J. M., & Roos-Hesselink, J. W. (2011). Birth prevalence of congenital heart disease worldwide: A systematic review and meta-analysis. *Journal of the American College of Cardiology*, 58(21), 2241–2247. <https://doi.org/10.1016/j.jacc.2011.08.025>

Warnakulasooriya, P. H., & Kasturiaratchi, K. (2020). Quality of life of caregivers with children having congenital heart disease awaiting cardiac surgery at the Lady Ridgeway Hospital for Children, Colombo, Sri Lanka. *Sri Lanka Journal of Child Health, 49*(1), 17–22. <https://doi.org/10.4038/sljch.v49i1.8892>

Yildiz, A., Celebioglu, A., & Olgun, H. (2009). Distress levels in Turkish parents of children with congenital heart disease. *Australian Journal of Advanced Nursing, 26*(3), 39–46.



# International Journal of KIU

Journal home page : <https://ij.kiu.ac.lk/>  
DOI: <https://doi.org/10.37966/ijkiu2024051050>



## Original Article

# Use of Interaction for Enhanced Communication in English as a Second Language Classroom

Nawanjala U.G.P.\*

Department of Languages, KIU, Sri Lanka

## Abstract

### Article history:

Received: 21.12.2023

Received in revised form:  
15.04.2024

Accepted: 06.06.2024

Cite as: Nawanjala U. G. P. (2024) Use of Interaction for Enhanced Communication in English as a Second Language Classroom, International Journal of KIU, 5 (1), 24-29. <https://doi.org/10.37966/ijkiu2024051050>

\*Corresponding author:  
[piyuminawanjala@kiu.ac.lk](mailto:piyuminawanjala@kiu.ac.lk)

**Introduction:** The acquisition of English as a Second Language (ESL) is in demand due to globalization. Although educators apply different techniques in teaching the English language effectively; acquiring a second language should incorporate interaction to facilitate both educators and learners to communicate effectively.

**Objective:** This review aims to empower educators to incorporate interaction into active learning within the ESL classroom by exploring valuable insights from scholarly perspectives, encompassing various types of interaction, interaction principles, the pivotal roles of teachers, and a diverse range of activities to enhance communication in ESL classrooms.

**Methodology:** A standardized methodology was deployed in this review. The literature review was carried out using keywords related to ESL classrooms and interaction to search for scholarly articles and books from 1978 to 2023. Non-peer-reviewed sources and non-English language studies were excluded. The extracted data were thematically analyzed.

**Results:** The review identified student interaction as a fundamental element in the acquisition of English as a second language. Further, it was found that various interaction types, peer interaction, interactive principles, the teacher's role, and classroom activities are conducive to enhanced communication in ESL classrooms.

**Conclusion:** Interaction stands as an indispensable foundation for achieving success in the acquisition of English as a second language. The factors discussed in this review empower educators to seamlessly integrate interaction into second language acquisition.

**Keywords:** Activities, ESL classrooms, Interaction, Second Language Acquisition, Teacher's role

## **Introduction**

English as a Second Language (ESL) classrooms are characterized by students with diverse linguistic backgrounds. Consequently, interaction among those students is an essential component of second language acquisition, exposing the learner to real-life communication (Allwright, 1984).

The significance of interaction in second language acquisition has been widely acknowledged from scholarly perspectives. Several studies have been conducted to determine the interaction between teacher-student and the whole class in second language learning (Duff, 2000). Within this context, Vygotsky's theory emphasizes that the process of language acquisition is not an innate skill, but a skill tailored through social interaction. Adaba (2017) argues that interaction is the heart of communication in an era of communicative language teaching. In addition, Allwright (1984) states that classroom interaction has received rigorous attention from interactionist researchers. Further, Hall and Verplaetse (2000) emphasizes the significance of classroom interactions as a means of promoting language development. Given these insights, it is apparent that interaction is a crucial component in second language acquisition.

In 1988, Van Lier introduced a framework comprising four distinct types of interaction in language learning environments. These types include less topic-oriented and less activity-oriented interaction, more topic-oriented and less activity-oriented interaction, more topic-oriented and more activity-oriented interaction, and less topic-oriented and more activity-oriented interaction. Understanding and harmonizing these varieties of interactions empower educators to establish a comprehensive language-learning atmosphere (Soler & Pitarch, 1992).

Therefore, this review seeks to analyse the existing literature on interactions in ESL classrooms with a focus on understanding the types of interaction, interaction principles, the

role of teachers, and classroom activities that increase interaction in ESL classrooms. The theories explored in this review encourage educators to incorporate interaction, thereby promoting active learning. As a result, fostering interaction benefits educators and empowers learners to communicate effectively in real-world scenarios by mastering the target language.

## **Methodology**

This comprehensive review uses a standardized methodology to search and extract literature. Initially, a set of keywords related to ESL classroom interaction and language learning were established, such as "English as a second language", "ESL classroom interaction", "language learning interaction", "target language interaction", "language acquisition", and "effective language teaching". These keywords and phrases were used in various combinations to capture a comprehensive range of articles published in peer-reviewed journals, conferences, and books. The search involved Google Scholar, PubMed and JSTOR. Non-peer-reviewed sources and non-English language studies were excluded. Four books and fifteen articles published from 1978 to 2017 were considered to ensure a comprehensive analysis. The extracted data were thematically analyzed and organized based on the key subjects of this review.

## **Discussion**

### *Perspectives of various researchers on interaction in ESL*

Lev Vygotsky's sociocultural theory of language and thought development (1978) shows that social interaction plays a decisive role in developing students' ability to use language, thereby leading towards intellectual development. Given Vygotsky's view, mental functions are not innate nor shaped, rather, influenced by social and cultural contexts. Further, his theory emphasizes that intellectual development is a social process that occurs through interaction with others.

Through this interaction, individuals engage in external speech, which enables them to organize their thoughts and regulate their behavior. Additionally, he contends that intellectual adaptation occurs when individuals move from their current level of development to a higher level and these transitions are facilitated through social interactions. Overall, Vygotsky's sociocultural theory of language and thought development highlights the importance of social interaction in cognitive development, emphasizing that the relationships formed between individuals in cultural and societal contexts are fundamental determinants of intellectual growth.

In a similar fashion, Allwright (1984, p.158) claims that interaction is “inherent in the very notion of classroom pedagogy itself”. He proposes that interaction is the fundamental fact of classroom pedagogy because everything in the classroom happens through a process of live person-to-person interaction. In his work, he emphasizes the importance of interaction in language learning and proposes ideas that challenge traditional teaching methods where teacher talk is dominant. He believed that language learners should be engaged in meaningful, real-life communication rather than simply memorizing vocabulary and grammar rules.

According to the study of Hall and Verplaetse (2000), interaction combines the latest theoretical insights in reconceptualizing how second and foreign languages are learned through a sociocultural lens with the practical considerations involved in teaching these languages effectively. It presents how particular practices constructed in classroom interaction promote learning of the target language. The authors claim that learning an additional language is accomplished in the interaction of a variety of classrooms and a variety of languages. This study helps to lay a foundation for the development of a more expansive, sociocultural model of second and foreign language learning with sustaining classroom interactional practices that foster additional language development.

Moreover, Adaba (2017) conducted a study in Tullu Sangota Primary School to assess teachers' application of classroom interaction on developing the students' speaking skills. The results revealed that “the findings of the study revealed that teachers rarely played their role to develop the students' speaking skills in the classroom due to lack of awareness, lack of simple materials to practice classroom interaction, low participation of the students in the class, and lack of access of teaching aids inhibits the teachers to apply classroom interaction” (Adaba, 2017, p.158). With these findings, authorities recommended deploying more classroom interactions to develop students' speaking skills in the target language. Further, it was recommended that teachers should facilitate appropriate classroom interaction by giving equal opportunities to the students to actively participate in these sessions. This study reaffirms the fact that interaction is essential to foster communication in the target language.

#### *Types of interaction in ESL classrooms*

When attention is paid to learning to communicate through interaction in ESL classrooms, it is essential to examine the various types of interaction employed. According to Van Lier (1988), there are four types of interaction.

- Type one is less topic-oriented and less activity-oriented. In this type, students are free to express their opinions freely and abide by the usual social norms. For example, small talk and private conversations in pairs.
- Type two interaction is primarily focused on topics rather than activities. In this context, participants engage in discussions to address tasks or subjects presented by the teacher in any possible way.

- Type three is more topic-oriented and more activity-oriented. Here, interaction is formed when students try to do the task with the teacher's guidelines. For example, communicative grammar lessons where students are allowed to practice the target grammar item through specific communicative tasks and activities.
- Type four is less topic-oriented and more activity-oriented. Learners may interact with authentic materials, cultural practices, or real-life situations that require language use.

These four types of interaction take place in the classroom and are determined by the roles of the participants, the tasks accomplished, and the type of knowledge they exchange (Kramsch, 1985). Recognizing and balancing these interaction types allows educators to create a well-rounded language learning environment that addresses fluency, vocabulary, critical thinking, and language accuracy, catering to the diverse needs of ESL learners.

#### *Factors affecting the interaction types*

It is crucial to pay attention to the factors affecting the above interaction types in ESL classrooms. According to Soler & Pitarch (1992), participant roles and task design can be considered factors affecting interaction types defined by Van Lier (1988).

In ESL classrooms, participant roles vary from traditional teacher and student roles to more flexible roles which are similar to natural conversation. However, Soler & Pitarch (1992) claim that the structured environment of the classroom constrains the ability of participants to engage in spontaneous and informal conversation, thereby impeding full interaction between them.

Task design is considered another factor affecting interaction types in ESL classrooms. Some tasks focus on giving and getting information, while others involve sharing ideas and negotiating meanings. Soler & Pitarch (1992) emphasize that it is essential to combine individual activities like providing information or correcting errors with group tasks such as solving problems or discussing texts as it facilitates learning through interaction. This approach helps students to communicate better with each other, making the learning experience more comprehensive and effective.

#### *Importance of peer interaction*

Many scholars support the idea that peer interaction is more effective than student-teacher interaction in acquiring a target language. Soler & Pitarch (1992) suggest peer interaction is more beneficial than student-teacher interactions in the process. Doughty & Pica (1986) and Porter (1983) also state that peer interaction is useful for understanding meaning and correcting errors in the target language. Seliger (1983) suggests learners receive more comprehensive input through peer interaction. However, fostering effective peer interaction is not always simple as "teachers often put students in a circle, give them a topic for discussion that they think is particularly stimulating and then watch the students just sit and look at one another in an embarrassing silence, constrained, and tense.

Then the teachers end up doing all the talking" (Bassano & Christison, 1987, p.201). This highlights the challenge: peer interaction in the target language is not always spontaneous, as students' language competence varies, and some may feel hesitant to communicate in another language. However, several studies (Doughty & Pica, 1986; Varonis & Gass, 1983) emphasize the importance of peer conversation in language classrooms.



---

### *Interactive principles in ESL classrooms*

Brown (2001, pp.54-70) outlines important interactive principles used in language learning classrooms: automaticity, intrinsic motivation, strategic investment, risk-taking, the language-culture connection, and communicative competence. Automaticity means that interaction in the target language becomes automatic and effortless. Intrinsic motivation occurs when learner gains self-actualization through interacting in the target language and start to appreciate their competence through self-reward. Risk-taking involves the possibility of not producing the intended meaning, not interpreting the intended meaning, and facing ridicule or rejection. Brown (2001) argues that lifelong rewards come with taking these interaction risks.

The language-culture connection means that the cultural knowledge required for communication can be developed through interaction. Communicative competence, the ability to communicate in a socially appropriate manner, can also be achieved through increased language interaction. These principles serve as guiding pillars for a comprehensive and successful language-learning journey through interaction.

### *Teacher's role in interaction*

The teacher's role in fostering second language acquisition is crucial, as students need proper guidance to initiate their interactions. Brown (2001, pp.165-168) describes the teacher's roles as a controller, director, manager, facilitator, and resource in language acquisition. As a controller, the teacher manages student interactions, determining when students should speak and interact. However, the teacher should ensure that students are at ease to make interactions more spontaneous. As a director, the teacher orchestrates structured interactive sessions, ensuring smooth and effective classroom interaction. As a manager, the teacher plans lessons, modules, courses, structures, and components, yet allows students the freedom to interact creatively. As a facilitator, the teacher

leverages intrinsic motivation by allowing students to discover the language through pragmatic use. As a resource, the teacher plays the least directive role, providing help and instruction when necessary, and guiding students to self-explore the language through interactions. Brown (2001, p.168) states, "The key to interactive teaching strives toward the upper non-directive end of the continuum, gradually enabling your students to move from their role of total independence (upon you, the class activities, the textbooks etc.) to relatively total independence". A skilled teacher should identify the learner's proficiency level and other contextual factors such as learning environment and socio-cultural background, with the goal of gradually enabling students to explore the language themselves through interactions.

### *Classroom activities to enhance interaction*

Selecting or designing proper classroom activities to achieve the expected interaction level in the target language is as important as selecting the teacher's role appropriately. In modern classrooms, group work is popular to supplement student interaction. Group work involves two or more students collaborating on a task. Brown (2001) mentions several benefits of group work: it provides students with a sense of security, motivates them through group interactions, and fosters a sense of responsibility for the group's actions and progress.

When planning group work, the right activity should be selected. Brown (2001) mentions several types of activities suitable for group work in classrooms. Games, as Harmer (2001) proposes, are important for incorporating fun into lessons along with targeted interaction. Roleplays allow students to practice real-world scenarios by assigning roles to each member.

Drama is a more formal version of roleplay, with higher student interaction as they engage in writing scripts, rehearsing, and performing. Interviews are another effective method for enhancing interactions. Additionally, Brown

(2001) mentions projects, brainstorming, information gaps, jigsaw activities, problem-solving, decision-making, and opinion exchange as effective group work activities. Adaba (2017) suggests more activities such as discussion activities, where students discuss a problem to enhance interaction, presentations to build self-confidence, and acting out written dialogues in front of the class.

## Conclusion

This comprehensive review of the literature on fostering students' interaction in ESL classrooms highlights the fundamental role of interaction in second language acquisition. The synthesis of insights from various sources and viewpoints underscores the importance of peer interaction, interactive principles, the teacher's role, and appropriate classroom activities in enhancing communication in ESL classrooms. Educators are encouraged to prioritize interactive approaches in their teaching methodologies, recognizing the profound impact of interaction on facilitating successful second language acquisition.

## References

- Adaba, H. W. (2017). Exploring the practice of teacher-student classroom interaction in ESL to develop the learners' speaking skills in Tullu Sangota Primary School grade eight students in focus. *Arts Social Science Journal*, 8, 295.
- Allwright, R. (1984). The importance of interaction in classroom language learning. *Applied Linguistics*, 5(2), 156-171.
- Bassano, F., & Christison, M. A. (1987). Developing successful conversation groups. In M. H. Long & J. C. Richards (Eds.), *Methodology in TESOL: A book of readings*, 201-207.
- Brown, H. D. (2001). *Teaching by Principles: An Interactive Approach to Language Pedagogy* (2nd ed.). Addison Wesley Longman, Inc.
- Doughty, C., & Pica, T. (1986). "Information gap" tasks, do they facilitate second language acquisition? *TESOL Quarterly*, 20, 305-325.
- Hall, J. K., & Verplaetse, L. S. (Eds.). (2000). *Second and Foreign Language Learning Through Classroom Interaction* (1st ed.). Routledge.
- Harmer, J. (2001). *The Practice of English Language Teaching*. Pearson Education Ltd.
- Kramsh, C. L. (1985). Classroom interaction and discourse options. *Studies in Second Language Acquisition*, 7(1), 169-183.
- Lier, V. L. (1988). *The Classroom and the Language Learner*. Longman.
- Oxford, R. L. (1998). Paper presented at the TESOL'98 Congress, Seattle, WA.
- Seliger, H. W. (1983). Learner interaction in the classroom and its effects on language acquisition. In Selinger and Long (Eds.), *Classroom Oriented Research in Second Language Acquisition*.
- Soler, E. A., & Pitarch, J. R. G. (1992). Learning interaction in the language classroom. *Lenguaje y Textos*, 2, 49-55.
- Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*.



# International Journal of KIU

Journal home page : <https://ij.kiu.ac.lk/>

DOI: <https://doi.org/10.37966/ijkiu2024051051>



## Original Article

### Families' Perceptions of Support from ICU Nurses in Teaching Hospital, Karapitiya, Sri Lanka

Dilhani M.G.T.<sup>1</sup>, Premathilaka A.W.A.<sup>1</sup>, Piumali K.J.P.<sup>1</sup>, Athukoorala A.A.C.D.<sup>1</sup>, De Silva W.I.C.<sup>1</sup>, Kariyawasam K.H.A.Y.<sup>1\*</sup>, Perera A.C.H.<sup>1</sup>, Nisansala M.W.N.<sup>2</sup>, Amarasekara A.A.T.D.<sup>3</sup>

<sup>1</sup>Faculty of Nursing, KIU, Sri Lanka

<sup>2</sup>Department of Fundamental Nursing, Faculty of Nursing, University of Colombo, Sri Lanka

<sup>3</sup>Department of Nursing and Midwifery, Faculty of Allied Health Sciences, University of Sri Jayewardenepura, Sri Lanka

#### Abstract

#### Article history:

Received: 24.01.2024

Received in revised form:  
10.05.2024

Accepted: 14.06.2024

Cite as: Dilhani M.G.T., Premathilaka A.W.A., Piumali K.J.P., Athukoorala A.A.C.D., De Silva W.I.C., Kariyawasam K.H.A.Y., Perera A.C.H., Nisansala M.W.N., Amarasekara A.A.T.D. (2024) Families' Perceptions of Support from ICU Nurses in Teaching Hospital, Karapitiya, Sri Lanka, International Journal of KIU, 5 (1), 30-35. <https://doi.org/10.37966/ijkiu2024051051>

\*Corresponding author:  
akindra@kiu.ac.lk

**Introduction:** The admission of a loved one to the Intensive Care Unit (ICU) is a stressful experience for the family. In this situation, the needs of family members are often overlooked by nurses focusing on the immediate needs of critically ill patients. Family-centered care provided by the nurses can be measured through the family members' cognitive and emotional perception of the support provided by the nurses.

**Objective:** To determine the families' perception of the support given by ICU nurses in the Teaching Hospital, Karapitiya, Sri Lanka.

**Methodology:** A descriptive cross-sectional study was conducted among 104 family members of patients who were treated in eight ICUs in the Teaching Hospital, Karapitiya using a consecutive sampling method. A self-administered questionnaire consisting of demographic information and Ice land-family perceived support scale (ICE-FPSQ) was used to collect data. Data were analysed using descriptive statistics such as frequencies and percentages through SPSS Version 25. Mean scores were calculated for the cognitive and emotional support subscales. Ethical approval was obtained from the Ethics Review Committee of KIU (KIU/ERC/21/194).

**Results:** The mean age of the participants was 38±7 years. Most of the participants were Sinhalese (92.3%, n=96) and 35-54 years (61.5%, n=64). Nearly, 34% (n=35) of the participants were spouses of the patients. The mean value of the overall support score (ICE-FPSQ) was 59.67±12.60 in dicating good support from ICU nurses. The mean value of cognitive perception was 21.27±7.30, in the subscale with a maximum value of 25. The mean value of emotional perception was 38.40±9.60, in the subscale with a maximum value of 45.

**Conclusion:** Families' perception of the support from ICU nurses was relatively high as indicated by the mean values of the cognitive and emotional subscales. Although the ICUs are overstretched with work, nurses must interact with families to offer the necessary support for both patients and family members, which enables them to manage the situation effectively.

**Keywords:** Family-centered care, Emotional support, Cognitive support, ICU Nurses

## **Introduction**

Family-centered care in healthcare delivery systems emphasizes the importance of the well-being of the entire family rather than solely addressing the illness of a family member (Wright & Bell, 2009). Patients might undergo a scheduled admission after surgery, or admission could be unforeseen, such as after an accident or due to a sudden and critical deterioration in their health (Health Information for Western Australians, 2021). In this manner, intensive care refers to the specialized treatment given to patients who are acutely unwell and require critical medical care (Adams et al., 2017).

Accordingly, families' perceptions regarding the support provided by Intensive Care Unit (ICU) nurses vary widely depending on individual experiences and circumstances (Iranmanesh et al., 2014). Notwithstanding, ICU nurses are often highly regarded and valued by families for the pivotal role they play in the care of critically ill patients. Thus, families usually value the compassion and empathy shown by ICU nurses (Iranmanesh et al., 2014). It may include the ability to provide emotional support, listen to concerns, and offer reassurance during challenging situations (Emmamally & Brysiewicz, 2019). Further, they are required to be highly proactive in communication, providing regular updates on the patient's condition and explaining medical procedures. The medical knowledge, expertise, and technical skills of ICU nurses are appreciated, making them perceived as highly trained professionals capable of effectively managing complex medical situations (Iranmanesh et al., 2014).

Collaboration with the healthcare team for informed decision-making is crucial for families, who often turn to ICU nurses for guidance in challenging situations such as end-of-life care or transitioning to palliative care (Hsiao et al., 2017). Responsive and attentive nursing care, even in busy environments, is greatly appreciated by families seeking support. While these perceptions are generally positive, individual

experiences may differ (Adams et al., 2017). Some families may have had negative encounters or have felt that the support provided by ICU nurses was inadequate. The needs of family members are often neglected by critical care nurses who prioritize addressing the immediate needs of critically ill patients (Kohi et al., 2016). This oversight occurs because nurses may delay, forget, or avoid interacting with families due to uncertainties about the patient's recovery and their discomfort in communicating concerns (Emmamally & Brysiewicz, 2019). Furthermore, nurses may underestimate the needs of family members, who seek sufficient information to feel accepted by the staff, maintain hope, and stay informed about changes in the patient's condition (Malliarou et al., 2014).

As a result, patients' families often have communication deficiencies, which are caused by conflicts in critical care settings between nurses and families with diverse cultural backgrounds bringing beliefs and understandings that can harm the critical care process (Malliarou et al., 2014). Consequently, critical care nurses should assess family needs and foster a sense of optimism in family members to encourage them to participate in their patient's care and help them adjust to critical settings (Malliarou, 2014).

It is worth noting that the ability of the family to adapt and provide support to the patient may affect the patient's recovery. If the family needs cannot be met, this may have a negative effect on families' perception, appraisal and adaptation to the crisis caused by critical illness (Wright & Bell, 2009). The role of nurses in the critical care setting is important in the provision of support and information to these families to cope effectively with the stress associated with critical illness (Kohi et al., 2016). For this reason, nurses should act as mediators and interpret information that helps the patient's family understand what physicians say and the relevance of that information for a patient's prognosis and decisions about treatment (Adams et al., 2017). Additionally, nurses need to provide effective and immediate psychological support

and education to the family because the latter has minimum control over the patient's condition during the first few days of hospitalization (Maxwell, 2007).

The long-term impacts of families' encounters in the ICU, particularly in terms of psychological and emotional consequences, remain underexplored. The effectiveness of interventions and support programmes initiated by ICU nurses to address the unique needs of families in Sri Lanka also requires greater scrutiny. A comprehensive understanding of these aspects is crucial for tailoring healthcare practices to the local context and enhancing the quality of support provided by ICU nurses to families in Sri Lanka. Therefore, the current study aimed to assess the families' perception of the support given by the ICU nurses in a selected hospital in Sri Lanka.

## **Methodology**

A descriptive cross-sectional study was conducted to determine the families' perceptions of the support given by ICU nurses at Karapitiya Teaching Hospital in Sri Lanka. Family members of ICU patients were recruited using the consecutive sampling method. A sample of 104 family members who were willing to participate and had given written informed consent were included in the study. The data were obtained using a self-administered questionnaire which consisted of demographical details, and the family's perception, which was assessed using an Iceland Family Support Questionnaire (ICE-FPSQ) (Svavarsdottir & Sveinbjarnardottir, 2009).

The questionnaire is about the family members' perceptions of cognitive and emotional support received from nurses caring for the ICU patients. It is divided into two categories namely cognitive support (5 statements) and emotional support (9 statements) (Svavarsdottir & Sveinbjarnardottir, 2009). The statements were measured on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). ICE-FPSQ scores range from a minimum of 14 to a maximum of 70

points, with a higher score predicting perceptions of greater support. The cognitive and emotional subscales have minimum and maximum scores of 5 to 25, and 9 to 45 respectively. Collected data were entered into a database created using Microsoft Excel 2019. After data cleaning, the Excel database was exported into the IBM SPSS version 25. Data were analyzed using descriptive statistics including frequencies and percentages. Mean scores were calculated for the cognitive and emotional support subscales. Ethical approval (KIU/ERC/21/194) was obtained from the Ethics Review Committee of KIU.

## **Results**

All 104 family members of ICU patients completed the questionnaire, resulting in a 100% response rate. The mean age of the participants was  $38 \pm 7$  years. An equal number of females and males participated in the study, with nearly half of the participants having education up to Advanced Level (50%,  $n=52$ ). Additionally, the majority of the participants were Sinhalese (92.3%,  $n=96$ ). The largest portion, which comprised 75% ( $n=78$ ), included spouses (33.7%), children (25%), or parents (16.3%) of the ICU patients and the remaining 25% ( $n=26$ ) included others such as caregivers, family relatives etc.

The mean value of the overall support score (ICE-FPSQ) was  $59.67 \pm 12.60$  indicating good support from ICU nurses. The cognitive support subscale had a mean score of  $21.27 \pm 7.30$ , with minimum and maximum scores of 5 and 25 respectively. The mean score on the emotional support scale was  $38.40 \pm 9.60$  with a minimum and maximum score of 9 to 45 respectively. Hence it implies that the cognitive and emotional perceptions of the family members towards ICU nurses are of a higher value.

According to the results from ICE-FPSQ most of the family members claimed that the nurses provided information and professional opinions to the family (65%,  $n=68$ ) and the information about the health condition (89.4%,  $n=93$ ). The study revealed that nurses provided (99%,

n=103) family meetings. Nearly half of the family members (56.6%, n=59) believed that nurses sometimes or rarely emphasize the importance of family rituals for curing. Most (71.2%, n=74) family members believed that nurses usually helped them recognize their emotional responses and helped them in normalizing their emotional responses. In the study, 98% (n=101) of family members believed that nurses almost always encouraged the family to get involved with the healthcare team in the care of the patient while 71.2% (n=74) of family members believed that nurses usually encouraged them to share their illness narratives. The majority (93.2%, n=97) of the family members perceived that nurses usually helped them to understand how their emotional response is related to the patient's illness while 86.5% (n=90) of family members believed that nurses almost always encouraged them to take a respite from caregiving.

The family members' emotional perceptions were significantly associated with age ( $p=0.007$ ), gender ( $p=0.034$ ) and ethnicity ( $p=0.002$ ). Statistically, there were no significant differences between families' perceived support and educational status and relationship to the patient.

## **Discussion**

The study found that family members of ICU patients generally have positive perceptions of ICU nurses, both cognitively and emotionally. Emotional support perceptions varied significantly based on the family members' age, gender, and ethnicity, but not their education level or relationship to the patient. This suggests that while overall views are favourable, demographic factors do influence how emotional support is perceived.

In contrast to the family support score reported in South Africa (22.3), the present study setting demonstrated an overall support care score of 59.6 (Emmamally & Brysiewicz, 2019). Given that the maximum attainable score for overall support is 70, the findings of the current study suggest that family support is notably high

among the ICU nurses in the selected teaching hospital. This high level of support can have a positive impact on patient care and the healthcare system. Also, another Danish and Australian study indicated a similar score of 44.3 and 40.2, respectively (Dieperink et al., 2018). Thus, the ICU environments often afford nurses an opportunity for extended communication with family members due to the prolonged patient stays inherent to ICU care rather than other units in the hospital. This prolonged interaction may foster connection and more favourable perceptions among family members, allowing ICU nurses to engage in more comprehensive and effective communication strategies.

Participants' perception of cognitive support from ICU nurses was high in comparison with previous studies which indicates the positive impact. Australian and Danish studies with cancer patients' families and a Swedish study with the parents of congenital heart disease also reported higher values of 19.8 (Dieperink et al., 2018) and 14.0 (Bruce et al., 2016) respectively. In the current study, the aggregate good cognitive support scores indicate a high level of attainment, 47% of the surveyed individuals noted occasional emphasis by ICU nurses on integrating family rituals for enhancing patient health.

These cultural beliefs and ritualistic practices among family members may yield positive outcomes as seen in this study. In support of the current study findings, a study conducted in Africa underscored the necessity for healthcare professionals to exhibit increased sensitivity and responsiveness to this subject (De Beer & Brysiewicz, 2016). Given Sri Lanka's status as a multiethnic and culturally diverse nation, demonstrating respect for diverse beliefs and accommodating potential ritual requirements could serve as a significant psychological support mechanism.

However, practical constraints may arise wherein ICU nurses and staff might encounter challenges in fulfilling all requirements due to institutional guidelines and limitations within the ICU setting.

Furthermore, family members in the current study perceived high emotional support from nurses compared to studies conducted by Bruce et al. (2016) and Emmamally et al. (2018), where patients in their study perceived average emotional support from nurses as  $19.0 \pm 10.3$  and  $18.4 \pm 9.6$  respectively. According to Dieperink et al. (2018) families that indicate low emotional support ( $9.8 \pm 6.2$ ) from HCPs have unmet emotional needs that impact negatively on their ability to cope with the illness. The current study findings showed higher emotional support provided by the ICU nurses in Karapitiya Teaching Hospital. Most family members held the perception that the provision of emotional support by nurses, particularly through meaningful communication (Botes et al., 2016), facilitated a process of capacity building. This observed outcome may stem from nurses dedicating increased attention to acknowledging and attentively addressing the emotional states and sentiments of family members, thereby fostering a more empathetic and responsive interaction. Moreover, the sociocultural and ethical framework within the Sri Lankan societal and healthcare context likely exerts influence on this phenomenon within the local setting.

## Conclusion

In conclusion, this study reveals noteworthy insights into the perceptions of family members regarding the support provided by ICU nurses. The cognitive support subscale and the emotional support scale both demonstrate elevated levels of perceived support, underscoring the valuable role of ICU nurses in facilitating patient-family interactions. ICUs in both developing and developed countries face challenges in implementing the family-centred care approach. The challenges focus mainly on resource constraints and a rapid-pace, patient focused clinical environment, but at the same time they reinforce the need to support families in their experience of these circumstances. To enhance family engagement and empowerment in emergency ICUs, it is recommended to develop initiatives for both cognitive and emotional support.

## Acknowledgments

The authors thank the participants for their time and effort as well as the staff of the hospital to conduct the study.

## Conflicts of Interest

No conflict of interest

---

## References

- Adams, A. M. N., Mannix, T., & Harrington, A. (2017). Nurses' communication with families in the intensive care unit—a literature review. *Nursing in critical care*, 22(2), 70-80. <https://doi.org/10.1111/nicc.12141>
- Botes, M. L., & Langley, G. (2016). The needs of families accompanying injured patients into the emergency department in a tertiary hospital in Gauteng. *Curationis*, 39(1), 1-7. <https://hdl.handle.net/10520/EJC191725>
- Bruce, M. M., Kassam-Adams, N., Rogers, M., Anderson, K. M., Sluys, K. P., & Richmond, T. S. (2018). Trauma providers' knowledge, views and practice of trauma-informed care. *Journal of Trauma Nursing: The Official Journal of the Society of Trauma Nurses*, 25(2), 131. <https://doi.org/10.1097%2FTN.0000000000000356>

- Dieperink, K. B., Coyne, E., Creedy, D. K., & Østergaard, B. (2018). Family functioning and perceived support from nurses during cancer treatment among Danish and Australian patients and their families. *Journal of Clinical Nursing, 27*(1-2), e154-e161. <https://doi.org/10.1111/jocn.13894>
- Emmamally, W., & Brysiewicz, P. (2019). Families' perceptions of support from health care professionals in the three emergency departments in KwaZulu Natal, South Africa. *International Journal of Africa Nursing Sciences, 10*, 55-60. <https://doi.org/10.1016/j.ijans.2019.01.004>
- Hsiao, P. R., Redley, B., Hsiao, Y. C., Lin, C. C., Han, C. Y., & Lin, H. R. (2017). Family needs of critically ill patients in the emergency department. *International Emergency Nursing, 30*, 3-8. <https://doi.org/10.1016/j.ienj.2016.05.002>
- Iranmanesh, S., Sheikhrabori, A., Sabzevari, S., Frozy, M. A., & Razban, F. (2014). Patient family needs: perception of Iranian intensive care nurses and families of patients admitted to ICUs. *Asian Journal of Nursing Education and Research, 4*(3), 290-297. ISSN: 2349-2996
- Kohi, T. W., Obogo, M. W., & Mselle, L. T. (2016). Perceived needs and level of satisfaction with care by family members of critically ill patients at Muhimbili National hospital intensive care units, Tanzania. *BMC Nursing, 15*(1), 1-7.
- Malliarou, M., Gerogianni, G., Babatsikou, F., Kotrotsiou, E., & Zyga, S. (2014). Family perceptions of intensive care unit nurses' roles: a Greek perspective. *Health Psychology Research, 2*(1). <https://doi.org/10.4081%2Fhpr.2014.994>
- Svavarsdottir, E. K., & Sveinbjarnardottir, E. K. (2009). The Iceland-Family Perceived Support Questionnaire (ICE-FPSQ). *Unpublished manuscript. University of Iceland, Faculty of Nursing, Reykjavik, Iceland*. Retrieved from <https://uni.hi.is/eks/instruments/ice-fpsq>.





## Original Article

# Knowledge regarding Human Papillomavirus Infection among Female Students in Kalutara District, Sri Lanka

Jayathilaka A.D.<sup>1</sup>, Bandara E.M.N.M.<sup>1</sup>, Senarathna U.H.D.N.N.<sup>1</sup>, Withana A.S.<sup>1</sup>, Sanfara F.<sup>1</sup>, Fernando A.M.F.<sup>2</sup>, Rasanjane D.D.Y.<sup>3</sup>, Kottahachchi J.<sup>4</sup>

<sup>1</sup>Faculty of Health Sciences, Department of Biomedical Science, KIU, Sri Lanka

<sup>2</sup>Research and Innovation Division, KIU, Sri Lanka

<sup>3</sup>Department of Biomedical Science, KIU, Sri Lanka

<sup>4</sup>Department of Microbiology, University of Sri Jayewardenepura, Sri Lanka

## Abstract

### Article history:

Received: 23.02.2024

Received in revised form:  
20.07.2024

Accepted: 08.08.2024

Cite as: Jayathilaka A.D., Bandara E.M.N.M., Senarathna U.H.D.N.N., Withana A.S., Sanfara F., Fernando A.M.F., Rasanjane D.D.Y., Kottahachchi J. (2024) Knowledge regarding Human Papillomavirus Infection among female students in Kalutara District, Sri Lanka, International Journal of KIU, 5 (1), 36-43. <https://doi.org/10.37966/ijkiu2024051052>

\*Corresponding author:  
yasoda@kiu.ac.lk

**Introduction:** Human Papilloma Virus (HPV) infection is a significant public health issue, particularly among young women who are at risk of developing related complications. These complications can include cervical cancer, genital warts, and other serious health problems that can have long-term effects. Therefore, understanding the level of knowledge about HPV and its transmission is essential for developing targeted educational and preventive strategies to mitigate these risks.

**Objective:** This study aimed to assess the knowledge regarding HPV infection among female Advanced-Level students in Kalutara District, Sri Lanka.

**Methodology:** A descriptive cross-sectional study was conducted among 439 voluntarily consenting female Advanced-Level students in Kalutara District, Sri Lanka. The data were collected using a self-administered questionnaire and were analysed using descriptive statistics via IBM SPSS version 25. The total knowledge scores ranged from 0-10 and categorised according to the Bloom's cutoff as follows: high knowledge (80%-100%), moderate knowledge (60%-79%) and low knowledge (<59%). The ethical approval was obtained from the Ethics Review Committee of KIU (KIU/ERC/22/083).

**Results:** Of the 439 participants, the majority of the participants were 18 years (98.4%, n=432) and Buddhists (87.47%, n=384). Nearly half of the participants (54.90%, n=241) have not heard of HPV infection. The majority of the participants (81.32%, n=357) did not know the mode of transmission of HPV and their main source of information was parents (28.02%, n=123). The total mean knowledge score was  $1.16 \pm 1.56$  whilst most of the participants (98.63%, n=433) had low level of knowledge regarding HPV infection and only 6 (1.37%) participants had moderate knowledge whilst none of them had high level of knowledge.

**Conclusion:** The study concludes with a low level of knowledge regarding HPV infection among female students in Sri Lanka. The study findings highlight the current knowledge levels, which emphasize the importance of monitoring and evaluating the impact of educational programs over time.

**Keywords:** Female students, Human Papilloma Virus, Knowledge, Sri Lanka

## **Introduction**

Sexually transmitted infections (STIs) are initially contracted through sexual contact and have a high global rate of morbidity and mortality, affecting 50% to 70% of sexually active individuals (Yarbrough & Burnham, 2016). Human papillomaviruses (HPVs) are a diverse group of double-stranded DNA viruses that target epithelial cells (Egawa & Doorbar, 2017). Persistent HPV infection is a significant sexually transmitted disease, responsible for more than 5% of all cancers worldwide. In fact, more than half of all infection-related malignancies are caused by HPV (Plummer et al., 2016). Approximately 90% of HPV infections clear or become dormant within 1 to 2 years. Statistics indicate that the majority of women who test positive for high-risk HPV serotypes develop cervical cancer within 3 to 5 years (de Sanjose et al., 2010).

At the same time, cervical cancer, caused by HPV, is the fourth leading cause of cancer-related deaths among women globally. According to the World Health Organization (WHO), there were 604,000 new cases and 342,000 deaths in 2020. Several risk factors including early age of first sexual intercourse, multiple sexual partners, smoking, transmission from mother to baby during pregnancy and poor immune function are common aetiological factors that contribute to the spread of HPV infection (Sri Lanka: Human Papillomavirus and Related Cancers, Fact Sheet, 2023).

In the context of Sri Lanka, 8.83 million women aged 15 years and older are at risk of developing cervical cancer. Current data indicate that every year, 1,407 women are diagnosed with cervical cancer and 780 dies from the disease occurring for the second most frequent cancer among women in the country (Gunasekara, et al., 2022). However, the HPV vaccine has proven efficacy in protecting against HPV-related diseases, thus reducing the disease burden. In Sri Lanka, vaccines against HPV were approved in 2009,

and in July 2017, the government introduced a two-dose schedule of HPV vaccination for all 10-11-year-old girls as part of the National Immunization Program. Meanwhile, in 1998, the country initiated cervical cancer screening using conventional Papanicolaou (Pap) smear tests in Well Women Clinics (WWCs) However, even after two decades of Pap cytology screening, there has been no significant reduction in the incidence, morbidity, and mortality rates of cervical cancer in the nation (El-Mansouri et al., 2022). This suggests that although the developed countries have effectively controlled the incidence of cervical cancer, the developing countries have struggled, accounting for 90% of new cases and deaths worldwide in 2020 (Sung et al., 2020). Therefore, the study aims to assess the knowledge about HPV infection among female Advanced-Level students in the Kalutara District of Sri Lanka.

## **Methodology**

### *Study design, setting and sample*

A descriptive cross-sectional study was conducted among voluntarily consenting female Advanced-Level students in Kalutara District, Sri Lanka. The study population, which comprised of female students aged 18 or above, was selected through a simple random sampling technique from eight different schools in Kalutara District, Sri Lanka. Conversely, exclusion criteria precluded individuals with communication impairments, mental disorders, critical illnesses, and the questionnaires with incomplete responses. The sample size was calculated using the Daniel formula which comprised 439 participants.

### *Study instruments*

The data were collected using a self-administered questionnaire, which was administered in either English or Sinhalese, according to the linguistic preferences of the participants. The questionnaire comprised two sections including (1) demographic details such as age, religion, stream and general information regarding HPV such as its consciousness, mode of transmission and source of information; (2) 10 items regarding the knowledge on HPV, which was developed based on the literature review of previous studies (Kasymova et al., 2019; Saqer et al., 2017; Khan et al., 2016). The questionnaire was pre-tested using 30 participants, thereby obtaining a Cronbach's alpha of 0.84, which demonstrates its satisfactory reliability in the current study.

### *Data analysis*

The data were entered in Microsoft Excel and all variables were reviewed to ensure data accuracy and to identify missing values. Data were analyzed using the IBM Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics, including frequency, mean, standard deviation, and percentages, were employed to present participants' demographic data whilst the knowledge related items were analysed based on Bloom's cut off point.

Possible responses for the knowledge-related items included "true", "false" and "do not know". The total knowledge scores ranged from 0-10, with 1 point awarded for each correct response and none for an incorrect response. The "do not know" option was included to minimise the guessing effect and was scored as incorrect. Further, the total knowledge scores were categorised based on Bloom's cutoff categorising into 3 levels as high knowledge (scores from 8-10) (80%-100%), moderate knowledge (scores from 6-7.9) (60%-79%) and low knowledge (scores from 0-5.9) (<59%). In

addition, the mean total knowledge score was also determined.

### *Ethical considerations*

The study protocols were reviewed and approved by the Ethics Review Committee of KIU, Sri Lanka (KIU/ERC/22/083) whilst the permission was granted from the eight schools in Kalutara District, Sri Lanka. An informed consent was taken from all the voluntary participants and their responses were maintained with anonymity and confidentiality.

## **Results**

### *Demographics of the participants*

Of the 439 participants, all the participants responded thereby giving a response rate of 100% and almost all of them were female students aged 18-19 years. The majority of the participants were 18 years (98.4%, n=432) and only 1.6% (n=7) were 19 years. Among them, most of the participants were Buddhists (87.47%, n=384). In terms of academic streams, the largest contingent, comprising 35.31% (n=155) of the participants was enrolled in the commerce stream. Following closely, the second-highest participation was observed in the biology stream, accounting for 32.12% (n=141) (Table 1).

Out of the total participants, nearly half of them (54.90%, n=241) have not heard of HPV infection. On a similar note, a significant majority of the participants (81.32%, n=357) did not know the mode of transmission of HPV. Meanwhile, parents (28.02%, n=123), teachers (18.45%, n=81), and television (21.87%, n=96) play significant roles as information sources (Table 1).

Table 1: Demographic characteristics of the participants (N=439)

	Frequency (N=439)	Percentage (%)
Mean age	18±0.1 years	
Age		
18 years	432	98.40
19 years	7	1.60
Religion		
Buddhist	384	87.47
Catholic	45	10.25
Other	10	2.28
Stream		
Biology	141	32.12
Physical science	88	20.04
Commerce	155	35.31
Technology	0	0
Arts	55	12.53
Heard of HPV infection		
Yes	198	45.10
No	241	54.90
Mode of transmission of HPV		
Air	0	0
Sexual intercourse	74	16.85
Food	8	1.83
Do not know	357	81.32
Source of information of HPV		
Teachers	81	18.45
Parents	123	28.02
Friends	94	21.41
Television	96	21.87
Books	45	10.25

Knowledge of HPV infection among the participants

According to Table 2, it was revealed that most of the participants responded “do not know” option regarding the knowledge on HPV infection. On the other hand, the total mean knowledge score was 1.16±1.56. In addition, Figure 1 demonstrates that, most of the participants (98.63%, n=433) had low level of knowledge regarding HPV infection where, only 6 (1.37%) participants had moderate knowledge whilst none of them had high level of knowledge.

Table 2: Knowledge related to HPV infection

	True n (%)	False n (%)	Do not know n (%)
There is a cure for HPV infection	0 (0)	22 (5.02)	417 (94.98)
An abnormal pap smear indicates that woman has HPV	45 (10.25)	3 (0.68)	391 (89.07)
HPV is not a very common virus	53 (12.07)	36 (8.20)	350 (79.73)
HPV increase with the number of sexual partners	24 (5.47)	85 (19.36)	330 (75.17)
HPV vaccine is currently offered freely to secondary school girls	142 (32.35)	8 (1.82)	289 (65.83)
HPV vaccine is delivered in a series of 3 shot injections over a monthly schedule	1 (0.22)	42 (9.57)	396 (90.21)
HPV cause cervical cancer	132 (30.07)	10 (2.28)	297 (67.65)
HPV affect both men and women	42 (9.57)	89 (20.27)	308 (70.16)
HPV can spread through blood or other body fluids	41 (9.34)	18 (4.10)	380 (86.56)
HPV do not have visible signs and symptoms	31 (7.06)	8 (1.82)	400 (91.12)

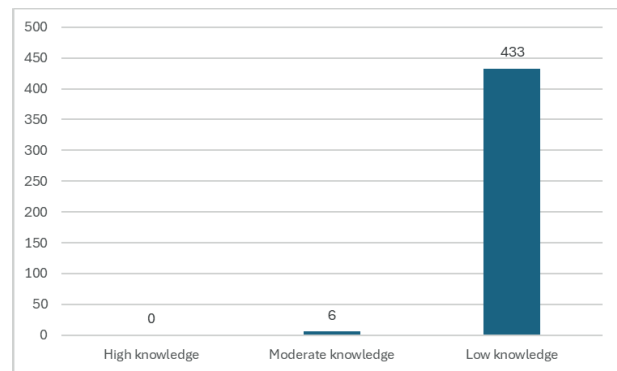


Figure 1: Overall prevalence of knowledge on HPV infection among female students in Kalutara District, Sri Lanka

Discussion

This study aimed to determine the level of knowledge about HPV infection among Advanced-Level female students in Kalutara District, Sri Lanka. Overall, the findings of the study revealed low level of knowledge among the students, which is unsurprising, given the lack of public education regarding the virus despite the inclusion of HPV vaccination in the national immunisation schedule. Meanwhile, nearly half of the participants had not heard of HPV infection and a significant number of participants did not know about the mode of transmission of HPV infection. Additionally, parents were the most common source of information regarding HPV infection. This contrasts with the growing trend globally, where social media increasingly serves as a source of health information (Schwendener et al., 2022).

Nevertheless, the disparity in knowledge levels regarding HPV infection varies across countries and regions. A similar study conducted in Sri Lanka among female students aged 18-20 years showed moderate level of knowledge (83.90%) about HPV infection (Bandara et al., 2023). However, other Asian countries have reported a low level of knowledge on HPV infection (Priyadarshani, Arunasalam & Noordeen, 2023). Similarly, a Lebanese study conducted among college students revealed their knowledge on

HPV infection was poor to moderate (Dany et al., 2015). Further, a study conducted in Turkey showed low knowledge among young girls and older individuals regarding HPV infection (Turhan et al., 2019).

These disparities of knowledge regarding HPV infection among these Asian countries could be attributed to several reasons such as cultural norms and attitudes, educational curricula about sexual health, healthcare infrastructure and accessibility to information regarding public health (Honnavar et al., 2023; Shetty et al., 2019; Kasymova et al., 2019). Notably, developing countries like Antigua and Barbuda exhibited higher awareness, attributed to the better knowledge among college-level students, who accessed information about HPV from the internet and health centers (Honnavar et al., 2023). Additionally, a survey conducted in Ethiopia (Getahum, et al., 2013), reported low knowledge of HPV infection which could be linked with a lack of efforts by policymakers and stakeholders to provide resources to enhance knowledge and attitudes toward HPV through mass media and health education outlets (Humnesa et al., 2022).

Regarding knowledge of preventive measures, most respondents were unaware that PAP smear screening is a preventive measure. According to a study by Makwe et al. in 2012, knowledge of HPV infection, cervical cancer risk factors, and preventive measures was poor among university students and healthcare workers. Similarly, another study conducted in Sri Lanka found that the overall knowledge score of the participants was inadequate (Priyadarshani, Arunasalam & Noordeen, 2023).

Most respondents in the current study were unaware that having multiple sexual partners is a risk factor for acquiring HPV infection. Similar findings were observed in a 2011 study among young, educated females from Sri Lanka, India, and Nepal (Joy et al., 2011). Awareness

of risk factors and transmission routes can encourage participants to adopt more effective preventive measures against HPV infection and cervical cancer. Conversely, a study conducted by Priyadarshani et al. (2023) reported high knowledge levels, indicating that the risk of HPV increases with the number of sexual partners. However, the accuracy of the study findings relies on the nature of the study population and the selection of an appropriate sample size (Priyadarshani, Arunasalam & Noordeen, 2023).

## **Conclusion**

The current study findings reveal that low knowledge of HPV infection among female Advanced-Level students in Sri Lanka. This lack of knowledge is concerning given the significance of HPV as a major risk factor for cervical cancer. The insights gained from this study highlight the urgent need for targeted educational interventions. Furthermore, the study provides a baseline understanding of the current knowledge levels, which can be used to monitor and evaluate the impact of educational programs over time.

## **Acknowledgments**

The authors of this study would like to thank all individuals for their time and effort spent during the data-collection period.

## **Declaration of conflicting interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## References

- Bandara, E.M.N.M., Jayathilaka, A.D., Senarathna, U.H.D.N.N., Withana, A.S., Sanfara, F., Rasanjane, D.D.Y., & Kottahachchi, J. (2023). Knowledge and awareness of Human Papillomavirus (HPV) infection among female students aged 18 – 20 in selected schools in Kaluthara district, Sri Lanka. *Proceedings of the 12th Annual Science Research Session, FAS, SEUSL*.
- Dany, M., Chidiac, A., & Nassar, A. H. (2015). Human papillomavirus vaccination: Assessing knowledge, attitudes, and intentions of college female students in Lebanon, a developing country. *Vaccine*, 33(8), 1001–1007. <https://doi.org/10.1016/j.vaccine.2015.01.009>
- de Sanjose, S., Quint, W. G., Alemany, L., Geraets, D. T., Klaustermeier, J. E., Lloveras, B., Tous, S., Felix, A., Bravo, L. E., Shin, H.-R., Vallejos, C. S., de Ruiz, P. A., Lima, M. A., Guimera, N., Clavero, O., Alejo, M., Llombart-Bosch, A., Cheng-Yang, C., Tatti, S. A., & Kasamatsu, E. (2010). Human papillomavirus genotype attribution in invasive cervical cancer: a retrospective cross-sectional worldwide study. *The Lancet Oncology*, 11(11), 1048–1056. [https://doi.org/10.1016/S1470-2045\(10\)70230-8](https://doi.org/10.1016/S1470-2045(10)70230-8)
- Egawa, N., & Doorbar, J. (2017). The low-risk papillomaviruses. *Virus Research*, 231, 119–127. <https://doi.org/10.1016/j.virusres.2016.12.017>
- El Mansouri, N., Ferrera, L., Kharbach, A., Achbani, A., Kassidi, F., Rogua, H., Ait Wahmane, S., Belmouden, A., Chouham, S., & Nejmeddine, M. (2022). Awareness and knowledge associated to Human papillomavirus infection among university students in Morocco: A cross-sectional study. *PLOS ONE*, 17(7), e0271222. <https://doi.org/10.1371/journal.pone.0271222>
- Getahun, F., Mazengia, F., Abuhay, M., & Birhanu, Z. (2013). Comprehensive knowledge about cervical cancer is low among women in Northwest Ethiopia. *BMC Cancer*, 13(1). <https://doi.org/10.1186/1471-2407-13-2>
- Gunasekera, K., Batuwanthudawa, R., & Senaratne, C. (2022). Knowledge on cervical cancer, human papilloma virus and vaccine, and attitudes towards immunisation following the introduction of vaccine to the National Immunisation Programme, Sri Lanka. *Sri Lankan Journal of Infectious Diseases*, 12(2), 17. <https://doi.org/10.4038/sljid.v12i2.8427>
- Honnavar P., Mansoor, E., Tulloch, C., Udayan U., Cosmello, I., Patel, P., & Bersma, A. (2023). Cervical Cancer and Human Papillomavirus Awareness among Women in Antigua and Barbuda. *Medicina-Lithuania*, 59(7), 1230–1230. <https://doi.org/10.3390/medicina59071230>
- Humnesha, H., Aboma, M., Dida, N., & Abebe, M. (2022). Knowledge and attitude regarding human papillomavirus vaccine and its associated factors among parents of daughters age between 9-14 years in central Ethiopia, 2021. *Journal of Public Health in Africa*, 13(3). <https://doi.org/10.4081/jphia.2022.2129>

- Joy, T., Sathian B., Bhattarai, C., & Chacko, J. (2011). Awareness of cervix cancer risk factors in educated youth: a cross-sectional, questionnaire based survey in India, Nepal, and Sri Lanka. *PubMed*, 12(7), 1707–1712.
- Kasymova, S., Harrison, S. E., & Pascal, C. (2019). Knowledge and Awareness of Human Papillomavirus Among College Students in South Carolina. *Infectious Diseases*, 12. <https://doi.org/10.1177/1178633718825077>
- Khan, T. M., Buksh, M. A., Rehman, I. U., & Saleem, A. (2016). Knowledge, attitudes, and perception towards human papillomavirus among university students in Pakistan. *Papillomavirus Research*, 2, 122–127. <https://doi.org/10.1016/j.pvr.2016.06.001>
- Makwe, C. C., Anorlu, R. I., & Odeyemi, K. A. (2012). Human papillomavirus (HPV) infection and vaccines: Knowledge, attitude and perception among female students at the University of Lagos, Lagos, Nigeria. *Journal of Epidemiology and Global Health*, 2(4), 199–206. <https://doi.org/10.1016/j.jegh.2012.11.001>
- Plummer, M., de Martel, C., Vignat, J., Ferlay, J., Bray, F., & Franceschi, S. (2016). Global burden of cancers attributable to infections in 2012: a synthetic analysis. *The Lancet Global Health*, 4(9), e609–e616. [https://doi.org/10.1016/s2214-109x\(16\)30143-7](https://doi.org/10.1016/s2214-109x(16)30143-7)
- Priyadarshani, H. S., Arunasalam, S., & Noordeen, F. (2023). Knowledge, attitude and practices towards human papillomavirus infection, vaccination and cervical cancer among paramedical students at a Sri Lankan University. *Sri Lankan Journal of Infectious Diseases*, 13(1), 31. <https://doi.org/10.4038/sljid.v13i1.8505>
- Saqer, A., Ghazal, S., Barqawi, H., Babi, J. A., AlKhafaji, R., & Elmekresh, M. M. (2017). Knowledge and Awareness about Cervical Cancer Vaccine (HPV) Among Parents in Sharjah. *Asian Pacific Journal of Cancer Prevention*, 18(5), 1237–1241. <https://doi.org/10.22034/APJCP.2017.18.5.1237>
- Schwendener, C. L., Kiener, L. M., Jafflin, K., Rouached, S., Juillerat, A., Meier, V., Schärli Maurer, S., Muggli, F., Gültekin, N., Baumann, A., Debergh, M., Guillot, C., Huber, B., Merten, S., Buhl, A., Deml, M. J., & Tarr, P. E. (2022). HPV vaccine awareness, knowledge and information sources among youth in Switzerland: a mixed methods study. *BMJ Open*, 12(1), e054419. <https://doi.org/10.1136/bmjopen-2021-054419>
- Shetty, S., Prabhu, S., Shetty, V., & Shetty, A. K. (2019). Knowledge, attitudes and factors associated with acceptability of human papillomavirus vaccination among undergraduate medical, dental and nursing students in South India. *Human Vaccines & Immunotherapeutics*, 15(7-8), 1656–1665. <https://doi.org/10.1080/21645515.2019.1565260>
- Sri Lanka: Human Papillomavirus and Related Cancers, Fact Sheet 2023*. (2023). ICO/IARC Information Centre on HPV and Cancer. [https://hpvcentre.net/statistics/reports/LKA\\_FS.pdf](https://hpvcentre.net/statistics/reports/LKA_FS.pdf)

Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. (2021). Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *Cancer Journal for Clinicians*, 71(3), 209–249.

Turhan, E., Cetin, S., Cetin, M., & Abacigil, F. (2017). Awareness and Knowledge Levels of 18-Year-Old and Older Individuals Regarding Human Papillomavirus (HPV) and HPV Vaccine in Hatay, Turkey. *Journal of Cancer Education*, 34(2), 234–241. <https://doi.org/10.1007/s13187-017-1292-6>

Yarbrough, M. L., & Burnham, C.-A. D. (2016). The ABCs of STIs: An Update on Sexually Transmitted Infections. *Clinical Chemistry*, 62(6), 811–823. <https://doi.org/10.1373/clinchem.2015.240234>





KIU



2719-2369