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Review Articles

Original Articles

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Original Article

Knowledge, attitude, and practice towards COVID-19, among an elderly population in Sri Lanka: A cross-sectional study

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Abstract

Background: Elderly people are at high risk for adverse effects from SARS-CoV-2 infection. Therefore, to prevent and lower the fatality rate of COVID-19 among elderly people, determining the knowledge, attitude and practice of the elderly population towards COVID-19 is needed.

Objectives: This study aimed to investigate the knowledge, attitude and practice (KAP) towards COVID-19, among an elderly population in Western province, Sri Lanka.

Results: A descriptive cross-sectional study was conducted among 414 elderly persons in the Western province, Sri Lanka. Data were collected using a pre-tested, self-administered/interview-based questionnaire. SPSS version 26 was used for the analysis of the study. Among the total participants (n=414), most respondents (80.68%) had good knowledge regarding COVID-19. Most of the participants (76.81%) were in good attitude category regarding COVID-19. Regarding practices towards COVID-19, the majority of participants (87.19%) had a good practice level. Total knowledge level was significantly associated with attitude level $p<0.001$ and practice level $p<0.001$ towards COVID-19.

Conclusion: Imparting knowledge, increasing good behavioral change, and strengthening preventive practices towards COVID-19 prevention is the best solution for pandemic control.

Keywords: COVID-19, Knowledge, Attitude, Practice, Elderly population

Introduction

The rapidly evolving outbreak of the Coronavirus Disease (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has proven to be a matter of utmost concern amongst global authorities, as countries worldwide struggle to combat this pandemic (Ladiwala et al., 2021). COVID-19 is an emerging respiratory illness that was first detected in Wuhan, China on 12th December 2019 (World Health Organization, 2020).

Everyone is susceptible to exposure and infection by coronavirus disease-19 (COVID-19), but evidence to date suggests that older people (people over 60 years old) and those with underlying medical conditions such as cardiovascular disease, diabetes, chronic respiratory disease, and cancer are the two groups at a higher risk of getting severe COVID-19 disease (Adhena & Hidru, 2020).

Common signs of COVID-19 infection include respiratory symptoms, fever, fatigue, myalgia, sore throat, nasal congestion, cough, dyspnea, nausea, vomiting, and/or diarrhea (Stawicki et al., 2020). Despite the fact that most COVID-19 infections are self-limiting, some patients have presented with different complications including organ damage, shock, lung parenchymal infections, acute respiratory distress syndrome (ARDS), venous thromboembolism, and pulmonary embolism (Bekele et al., 2020).

The virus is primarily transmitted via respiratory droplets and close contact with an infected person (Rothan & Byrareddy, 2020). SARS-CoV-2 can remain active for hours and even days on surfaces, therefore, touching infected surfaces can lead to the spread of infection (Sallam et al., 2020).

Although the U.S. food and drug administration (FDA) issued (SARS-CoV-2) mRNA vaccines that are currently available through Emergency Use Authorizations (EUAs), controlling infectious sources and interrupting transmission routes of the virus are regarded as reliable ways to control the spread of the disease (Krause & Gruber, 2020). Most importantly, the awareness, understanding, and adherence of the public to preventive measures recommended by health authorities are the key to pandemic control.

Many preventive and control methods were adopted in Sri Lanka such as the closure of public places (including schools, universities), imposing quarantine measures and administrating newly developed vaccines throughout the population. Further Sri Lankan government imposed strict lock down rules and the public was informed to stay indoors and work from home. Despite implementing different preventive measures, a second wave started from a cluster of cases in October 2020.

Although most studies in the world target health professionals and the general population, studies are sparse in relation to high-risk groups (the elderly population). Thus, this study aimed to determine the Knowledge, Attitude and Practice (KAP) towards COVID-19 and associated factors of poor knowledge and practice among elderly people in Western province Sri Lanka.

Methodology

A descriptive cross-sectional study was conducted among 414 elderly persons (≥60 years old) in the Western province, Sri Lanka. The participants were voluntarily recruited through convenient sampling. Inclusion criteria were those who volunteered and in elderly ≥ 60 years living in Western province Sri Lanka. A single population proportion formula (Lachenbruch et al., 1991), ($n = Z^2 p (1-p)/d^2$) was used to calculate the sample size. Since there was no published data that showed the knowledge, attitude, and practice toward COVID-19 among elderly people in Sri Lanka, 50% of prevalence (p= 0.5) was used to get the maximum sample size by considering 95% confidence interval (Z =1.96), marginal error (d) of 5% (0.05) and 5% non-response rate.

The data were collected through a pre-tested

questionnaire designed by the researchers using scientific literature. (Adhena & Hidru, 2020) (Zhong et al., 2020) (Yang et al., 2020) The questions/statements were modified to suit the objectives of the study. The questionnaire contained six sections and a total of 42 items. Section 1 was purpose of this research and informed consent of the participant. Second section was socio-demographic data which contained 9 questions. Third section was knowledge towards COVID-19 and it contained 10 structured questions on knowledge towards covid-19. The questions precisely covered the respondents' knowledge regarding the virus causing the disease, modes of transmission of the virus, main clinical symptoms of COVID-19, high risk population, preventive measures etc. Each correct knowledge item reported was awarded a score of 20 point. Incorrect knowledge was awarded a 0 score. For Likert scale, if "strongly agree" or "agree" was the correct answer, that was scored as 20 points while "Neutral/No idea" scored 10 points. If "disagree" and "strongly disagree" was scored as 0 point or otherwise reverse. For total knowledge score calculation, a score of less than 6 was considered as a low/poor level of knowledge, 7-13 denoted an average/satisfactory level, and more than 14 was considered good.

Forth section was attitudes towards COVID-19 and contained queries relating to attitudes. This part of the section assessed psychological state concerning views, opinion, morals, and characters to act in particular. It contained 5 structured queries with answers: "strongly agree", "agree", "disagree" "strongly disagree", and "no idea" and answers like "yes", "NO", "don't know" and "sometimes". Each correct attitude reported was awarded scores according to the reliability of the answer. Minimum score was "0" and maximum score was "20". A score of less than 6 was considered as poor attitude. Between 7-13 belonged to the average category. More than 14 was considered as good attitudes. Section 5 of the questionnaire measured practice related to COVID-19 in the elderly population. It contained 12 structured queries with answers:

"yes", "no" and "sometimes" and answers with "always", "sometimes", "rarely", "never". Each correct practice reported was awarded scores according to the reliability of the answer. The minimum score was 0 and maximum score was 20. The answers with "always" were allocated 20 points, "sometimes" 10 points, "rarely" 5 points and "never" 0 point or wise versa. A score of less than 10 was considered as poor practice. Higher than 11 was considered as good practice.

Section 6 of the questionnaire assessed the difficulties and challenges that the elderly population faced during the Covid-19 pandemic. This section contains 6 structured questions consisting with yes/no type answers and agree/ strongly agree/no idea/ disagree/strongly disagree answers. The minimum score was 0 and maximum score was 5. A score of less than 15 was considered to have less difficulties/challenges, a score of 15 - 22 was considered to have average difficulties and a score of higher than 22 was considered to have more difficulties. To ensure the quality and reliability of the questionnaire, the pre-test was conducted among 20 elderly people who are ≥ 60 years which are not included in the formal investigation. The finalized questionnaire was given to the participants of the study.

The demographic characteristics of the study sample and detailed results on KAP were expressed as percentages. Coding, entering and analysis of collected data was done in IBM Statistical Package for Social Sciences (SPSS) version 26. The KAP scores regarding COVID-19 among the elderly participants were expressed as mean and standard deviation (SD). Chi square test was used to assess the association between demographic characteristics and KAP score towards COVID-19. Statistical significance was defined as $p < 0.05$. Ethical approval was obtained from the ERC of KIU (KIU_ERC_21_91).

Results

Socio-demographic characteristics of the study populationx

Among the total participants (n=414), there were 211 (51%) females and 203 (49%) males. The majority (n=232) of the participants were in the 60-69 age group and least (n=40) of the participants were in the age group over 80. Of the study participants, most of the participants(n=268) were suffering from a chronic disease conditions like diabetes, hypertension or a cardiovascular disease. Most of the participants(n=204) had an educational level up to secondary school and most of the participants(n=228) had an income over Rs. 20,000 per month. Among the study participants 34.1% were from Colombo district, 31.6% from Gampaha district while 34.3% were from Kalutara district.

Knowledge towards COVID-19 among the study population

The results reflect that majority of respondents n=334 (80.68%) had a good knowledge regarding COVID-19,71(17.15 %) of respondents had an average knowledge and the least number of respondents n=9 (2.17%) had a poor knowledge. Mean knowledge score was 15.46 ± 3.124 (standard deviation). When considering about the gender of the participants, mean knowledge score among males was 15.19 ± 3.524 and that among females was 15.73 ± 2.665.
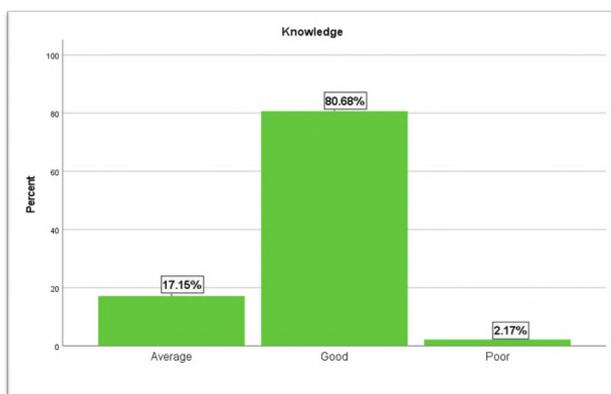
Figure 1 - Distribution of total knowledge level among participants

Pearson Chi – square tests were done between total knowledge level and socio-demographic data. The analysis was conducted using 0.05 significant levels. Based on the results, the following can be stated.

There was a significant association between total knowledge level and some socio-demographic factors; educational level ($p<0.001$), monthly income status ($p<0.001$), and sources of information on COVID 19 like television programs and news releases ($p<0.001$), friends/relatives ($p=0.002$), government announcements ($p=0.001$), radio ($p=0.002$).

No significant association was found between total knowledge level and most of the participants' socio-demographic factors such as age, gender, place of current residence, occupational status, presence or absence of chronic diseases, district of residence.

On assessment of knowledge of study participants, more than half of participants 56.8% (n=235) knew about the COVID-19 causing virus. Majority of the participants knew high grade fever (87.4%), dry cough (88.4%) and shortness of breath (92.3%) as main clinical symptoms of COVID 19 while 60.4% (n=250) of the participants knew that people with COVID-19 also show no symptoms can infect the virus to others. As high-risk population of COVID-19 for the severe outcome, 38.9% (n=161) of participants said children, 75.8% (n=314) said pregnant women, 83.3% (n=345) said elderly (over 60years) and 80.9% (n=335) said people with underlying medical conditions. As modes of transmission for COVID-19, 334 of participants said respiratory droplets (80.7%), 368 participants said direct transmission (88.9%), 323 of participants said indirect transmission (78.0%) and 345 of participants said airborne transmission (83.3%). Of the participants, 80.7% (n=334) knew that polymerase chain reaction (PCR) can be used to diagnose COVID-19. As per preventive measures for COVID-19 infection, 85.3% (n=353) of participants knew that handwashing with soap & water

prevented infection, 87.0% (n=360) knew about importance of social distancing, 90.1% (n=373) knew about isolation of suspected & confirmed cases and 90.6% (n=375) knew about wearing of personal protective equipment like face masks for prevention of infection. Of the study participants 306 (73.9%) agreed that currently, there is no effective drug for COVID-19, but the treatment of early symptoms and intensive care can help people with COVID-19 to recover. Of the participants 72.9% (n=302) agreed that the period between exposure to the infection and appearance of symptoms of COVID-19 is 2-14 days.

Attitudes towards COVID-19 among the study population

Results reflect that majority of respondents 318 (76.81%) had a good attitude regarding COVID-19 and 76 (18.36 %) of respondents had an average attitude while a small number of respondents 20 (4.83%) had a poor attitude. Mean attitude score is 15.66 ±4.00 (Standard deviation). When considering the gender of the participants, mean attitude score among males was 15.28 ± 4.36 and that among females was 16.03 ± 3.60.
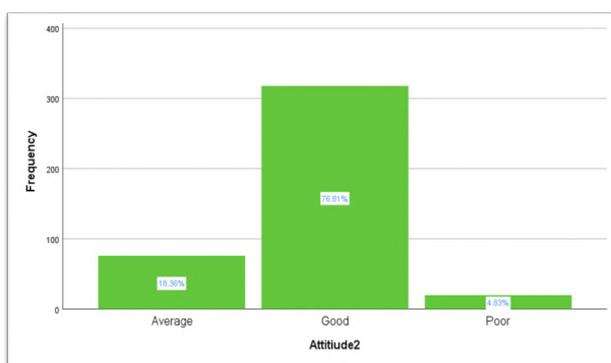
Figure 2 - Distribution of total attitude level among participants

The total knowledge level was significantly associated with the attitude level (p <0.001). There was a significant association between total attitude level and some socio-demographic factors such as educational level (p<0.001),

occupational status (p=0.028), presence of chronic disease (p=0.017), income status (p=0.022), and sources of information like television and news releases (p=0.016).

No significant association was found between total attitude level and socio-demographic factors such as age, gender, and place of current residence.

Vast majority of participants (84.5%) agreed with "Imparting the knowledge and information regarding COVID – 19 infection and its preventive measures mainly among the elderly population was important for the community". Further, 78% of the participants were seen to "To comply with any local restrictions on travel, movement or large gatherings is one of the important ways of prevention from COVID – 19". Majority of participants (79%) agreed that "People with fever, cough, and difficulty in breathing should seek medical attention". Majority of participants (82.4%) also agreed with the statement "Those who are elderly or chronically ill are more likely to be severely affected" by covid – 19. While 38.9% of participants agreed with the statement "COVID – 19 vaccinations would completely protect us from getting the disease" interestingly 37.4% of the participants disagreed with this statement. Also 23.7% of participants had no idea regarding the statement.

Practices towards COVID-19 among the study population

The results indicate that the majority of respondents 361 (87.2%) have been following good practices towards Covid-19 and 53 (12.8%) of them had poor practices. Mean practice score was 14.88±3.281 (Standard deviation). When considering the gender of the participants, mean practice score among males was 14.12 ± 3.211

and that among females was 15.68 ± 3.138.

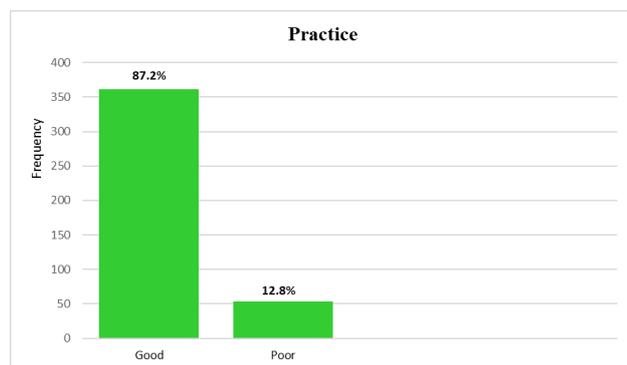Figure 3 – Frequency distribution of total practice level among participants

Total knowledge level of COVID-19 is significantly associated with the practices of all 414 participants since its p value is less than 0.05. There was a significant association between total practice level and some socio-demographic factors, such as educational level (p<0.001), occupational status (p=0.021), present chronic disease condition (p<0.001), district (p<0.001) etc. Knowledge level of COVID-19 is significantly associated with the total practice level (p<0.05).

No significant association was found between total practice level and most of the participants' socio-demographic factors such as gender, age, place of current residence, income status. The most significant effects on the total practices towards COVID-19 were due to educational level, presence of chronic diseases and the living district.

Majority of the participants 359 (86.7%) had worn a mask when they were in a crowded place. Only 45.4% (n=188) of them had always implemented physical distancing when they were in the crowd. Further, 169 (40.8%) of the participants had always used hand sanitizer when they were in crowded places and 41.1% (n=170) of them had sometimes used the sanitizer in crowded places.

More than half of the participants 229 (55.3%) had washed their hands with soap after going to a crowded place, while getting back home, before meals, or contacting dirty and contaminated items. Only 136 (32.9%) of the participants always had immediately changed their clothes before entering the house and having contact with family members. Interestingly 189 (45.7%) of them sometimes had done this practice. Majority of the participants 270 (65.2%) had eaten vegetables and fruits without washing. Most of the participants 296 (71.5%) had covered their nose and mouth while coughing or sneezing. More than 85% of the participants paid close attention to government and community reports on the epidemic and the living trajectory of infected people. Of the participants,121 (29.2%) of them avoided going to crowded places and avoided taking public transportation during the pandemic. More than 90% of the participants drank immunity boosting home remedies like coriander and had steam inhalation for at least 15 minutes at home. More than half of the participants 60.6% never smoked and 6.5% of the participants had smoked daily. More than 50% of them had never consumed alcohol and only 5.3% of the participants consumed alcohol daily.

Discussion

In Sri Lanka, reported data on KAP towards COVID-19 is limited, and this study was conducted to examine the knowledge, attitudes and practices towards COVID-19 among an elderly population. Though transmission of COVID-19 due to unsafe practices has been a public health issue, the epidemiological studies on KAP towards COVID-19 are inadequate. In this study, we tried to evaluate and report these important aspects of COVID-19 among elderly population (high risk group) in Sri Lanka.

The results reflected in this survey indicates that majority of the study participants (80.68%) have a good knowledge regarding COVID-19. This contrasted with the results of similar studies

done in other countries like Ethiopia, which was a very similar study conducted among high-risk group (an aging population) in Tigrai, Ethiopia, and that showed considerably poor knowledge levels (37.7%) among the participants (Adhena & Hidru, 2020).However, the results of the current study were congruent to the findings reported by previous studies conducted in Pakistan where it exhibited 93.3% (good) of adequate knowledge on COVID-19 (Ladiwala et al., 2021) and studies conducted in China where it exhibited a higher risk perception and a good knowledge of COVID-19 (Ding et al., 2020). Further, the results of this study were congruent to another KAP among Chinese residents where it showed the total scoring rate for knowledge as 85.2% (Yang et al., 2021).

The good knowledge level seen in this study is higher than the other study conducted in Ethiopia, (Adhena & Hidru, 2020,). The reason for this discrepancy might be due to a difference in the socioeconomic status of study participants, availability of information sources and variation in time of data collection period.

The majority of target study population in this study had access to electricity and internet. As a result, they had unlimited access to COVID-19-related updates and preventive measures posted online by the official government health authorities and different media that are shown to have a positive effect for improving knowledge, behavioral change and developing a positive attitude. Similarly, in studies done in China and Pakistan the data were collected during the main phase of the outbreak when most of their populations were exposed to a lot of information about COVID-19 that could lead to good knowledge towards COVID-19 (Ding et al., 2020, Ladiwala et al., 2021).

This survey results indicate that majority of respondents (76.81%) have a good attitude regarding COVID-19 while 18.36% had average level of attitude and only 4.83% had poor attitude level. Pakistan conducted a similar large cross-sectional survey in 2020 and found the majority (85.6%, n= 1027) of the Pakistani residents have a good attitude of COVID-19 (Ladiwala et al., 2021). However, a KAP inquiry held among frontline healthcare workers working in different hospitals in another neighboring country, Nepal demonstrated only 54.7% of positive attitude (Tamang et al., 2020).

Although all age groups are at risk of getting COVID-19 disease, older people face significant risk of developing severe illness due to physiological changes that come with ageing and possible underlying health conditions(Bekele et al., 2020). Therefore, this susceptible age group should practice good behaviors (Bekele et al., 2020)

Similar to this study, several previous studies done with residents of China (Ghimire et al., 2020), frontline healthcare workers in Nepal, the adult population in Bangladesh, Jordanian adolescents, and another study on Chinese residents, found good practicing skills toward COVID-19 prevention strategies (Yang et al., 2020, Tamang et al., 2020, Hossain et al., 2020, Dardas et al., 2020 Zhong et al., 2020). Another study that had been done in 2020 in the United States and the United Kingdom (Geldsetzer, 2020) found moderate practice toward combating COVID-19 (Geldsetzer, 2020). In contrary a study done in high-risk age groups in Ethiopia and among Chronic Disease Patients in Northwest Ethiopia, indicated that participants had poor practice toward prevention of the disease (Adhena & Hidru, 2020, Akalu et al., 2020)

Conclusion

Imparting knowledge, increasing good behavioral change, and strengthening preventive practices towards COVID-19 prevention is the best solution for pandemic control. Further, interventions are required to overcome the difficulties that are faced by the elderly population during the pandemic.

Acknowledgement

Conflicts of Interests

There are no conflicts of interest.

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Original Article

Compassionate love in marital satisfaction among married couples between the ages of 25-60 in the Kandy district

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Abstract

Background: Compassionate love plays an important role in marital satisfaction. The success of a marriage is disrupted due to factors such as a lack of support, and nurturance by partners, and not being able to share each other's feelings freely which have led to stress, depression, divorce, and suicide. The current study identified three age categories namely young-aged couples, middle-aged couples, and old-aged couples.

Objective: The current study aims to identify whether compassionate love leads to marital satisfaction in the three age categories.

Methodology: A descriptive cross-sectional study was conducted using 242 married couples through convenient sampling in the Kandy District. Data were collected by completing the Compassionate Love Scale for Specific Close Other and ENRICH Marital Satisfaction Scale (online), and the responses were recorded individually. The linear regression analysis was carried out using SPSS version 25. Ethical approval (KIU/ERC/21/13) was obtained from the Ethics Review Committee of KIU.

Findings: The sample included three different age categories namely, young-aged couples (54.1%, *n=131*), middle-aged couples (28.1%, *n=68*), and old-aged couples (17.8%, *n=43*). The result revealed that there is a weak positive significant correlation between compassionate love and marital satisfaction in young-aged couples, middle-aged couples, and old-aged couples with (*r=0.34, p<0.01* (M=28.9 SD=±3.07), *r=0.26, p =0.027* (M=43.8 SD=±4.17), *r=0.357, p=0.019* (M=54.8 SD=±2.63) respectively.

Conclusion: The findings showed that although compassionate love is correlated with marital satisfaction in the three age categories, the relationship is not very strong.

Keywords: *Compassionate Love, Marital Life, Marital Satisfaction*

Introduction

Marriage is considered important in shaping many people's lives (King, 2016) as it is one of the foundations for family life (Tummala, 2008). The purpose of marriage is satisfaction, love, companionship, children, adult identity, commitment, and personal fulfillment, etc. (Benokraitis, 2015). A satisfying marriage gives the spouse physical and emotional comfort, stability, spiritual friendship, and reassurance (Benokraitis, 2015). Thus, the spouses become complementary to each other by providing fulfillment of basic needs such as biological, mental, psychological, or spiritual. Partners find love and compassion, comfort and stability, tenderness and reassurance, and incline towards each other. This satisfying state can be achieved through compassionate love (Underwood, 2002). However, guaranteeing marital satisfaction in marriages is problematic due to the dissatisfaction and distress between the couples (Carr, 2000).

Factors such as stress and depression are caused due to lack of support, and nurturance by partners which was initiated by not being able to share each other's feelings freely (Carr, 2000). This has led to health problems such as cardiovascular disease, diabetes, and a high suicide rate among men than women (4 to 1) in the US (Scourfield & Evans, 2015). It results in divorce (Knox & Schacht, 2010) which is also a main problem in Sri Lanka (Amarathunga & Wickramaarachchi, 2018).

Sabey, Rauer, and Jensen (2014) have shown that the attitude of compassionate acts is linked to the sacredness of the marriage. Those who were able to withhold these two in their daily life exhibited satisfying relationships (Stanley et al., 2006). Another study by Sabey and Rauer (2017) indicated that compassionate love decreased over a year. However, they mentioned that this is not unexpected because other types of love too decrease similarly. There are few longitudinal studies to prove the fact that love decreases over a year (Berscheid, 2010). According to Hodes and Suzman (2007), the decline in the aggregate level of compassionate love may be due to the increasing need to take care of spouses and depending on each other as they become old.

Love as a feeling or emotion is not long-lasting in a marital relationship because feeling or emotion is a physiological arousal that has a climax and after it reaches the climax, it disappears (Hatfield & Walster 1978). Passionate love in a marriage does the same because marital satisfaction declines within a year or two into marriage (Hatfield et al., 2008). Therefore, the current study focuses on the love exhibited through behaviors, expressions, and actions that will help enhance marital satisfaction.

The current study is significant as it will help married couples gain a method to promote their well-being, and distressful couples will gain a way to get relief from their distress. The service providers for couples and families like counselors, psychologists, therapists, social workers, etc. will gain insight into the couples' well-being with special reference to compassionate love to deal with their health promotion and problems.

The previous works of literature capture the importance of compassionate love among young-aged couples and old-aged couples but not among middle-aged couples. The current study focuses on addressing the limitation by including middle-aged couples. Thus, the current study focuses on age categories which include young-aged couples, middle-aged couples, and old-aged couples. These three categories of people serve an important function in the operation of compassionate love in marital satisfaction. Therefore, the current study aims

to identify whether compassionate love leads to marital satisfaction in the three age categories.

Methodology

A descriptive cross-sectional study was conducted among 242 married couples using convenient sampling method in the Kandy district since it is one of the districts higher in intimate partner violence (Country Profile on Gender-Based Violence in Sri Lanka [CPGBV], 2018). The data were collected from February 2022 to May 2022. Ethical approval (KIU/ERC/21/13) was obtained from the Ethics Review Committee of KIU.

The participants were assessed using self-administered questionnaires which consisted of a demographic scale, a Compassionate Love Scale for Specific Close Others (Sprecher & Fehr, 2005), and an ENRICH Marital Satisfaction Scale (Fowers, & Olson 1993). The former scale had a Cronbach alpha value of 0.86 and the latter had a Cronbach alpha value of 0.94. The Compassionate Love Scale for Specific Close Other is a unidimensional scale that measures the presence of compassionate love for a specific close other. The score is calculated by adding the scores in all the items and dividing it by the number of items. The average score for a specific close other or marital partner is 5.92 (Sprecher & Fehr 2005). The score of an individual should be 5.92 or greater to determine whether an individual has compassionate love or is high in compassionate love. It has a Cronbach alpha value of 0.86 (Sprecher & Fehr 2005). The ENRICH Marital Satisfaction consists of two subscales: The marital Satisfaction Scale and Idealistic Distortion Scale. Individual scores are calculated by reverse scoring the negative items and summing up the appropriate items for each scale. Then the percentile scores are found using the norm table. Finally, the score is obtained by

the following formula in which PCT= percentile score for the Individual marital satisfaction scale and the ID= percentile score for the idealistic distortion scale: EMS= PCT - [(.40* PCT) (ID* .01)]. The higher score an individual gets, higher the marital satisfaction (Nunes et al., 2022). It has a Cronbach alpha value of 0.94 (Fowers, &Olson 1993).

The scales were translated into Sinhala and Tamil languages and were validated. The face and content validity were derived for both the Compassionate Love Scale for Specific Close Others and ENRICH Marital Satisfaction Scale, and the translated and validated scales showed good reliability of 0.96 and 0.89 respectively. The questionnaires were distributed online through a Google form and the link to the questionnaire was shared via social media platforms such as Email, and WhatsApp. The respondents were asked to fill out the questionnaire independently.

SPSS- version 25 was used for data analysis. Data were analysed using descriptive statistics and regression analysis was carried out to determine the relationship between compassionate love and marital satisfaction in different age categories.

Results

Demographic details of the participants

The current study comprised 242 married couples, and among them 53.7% were females (n=130) and 54.1% of married couples belonged to the young aged-couples category. The mean age of the participant was 37.72 (SD=±10.79). Most respondents were employed which is 62% (*n*=150). Table 1 shows the demographic details of the participants.

Table 1: *Demographic details of the participants*

Variables	Frequency (n=242)	Percentage (%)
Age		
Young-aged couples (25-35 years)	131	54.1
Middle-aged couples (36-49 years)	68	28.1
Old-aged couples (50-60 years)	43	17.8
Gender		
Male	112	46.3
Female	130	53.7
Employment		
Employed	150	62.0
Unemployed	92	38.0

Assessing compassionate love and marital satisfaction

Table 2 gives the frequency of married individuals under the three age categories who are low and high in compassionate love by using descriptive statistics. Overall, most married individuals (76.9%, *n=186*) show high compassionate love (M= 6.18, SD=±.84). The mean score of the marital satisfaction scale is 52.4 (SD=±11.35).

Table 2: *Descriptive statistics of the compassionate love scale*

		CLS category		Total	M	SD
		Low	*High*			
Age category	25-35	24 (18.3%)	107 (81.7%)	131	6.2	.83
	36-49	17 (25%)	51(75%)	68	6.1	1.04
	50-60	15 (34.9%)	28 (65.1%)	43	6.1	.52
Total		56	186	242		

Note: CLS= Compassionate Love Score.

Predicting Compassionate Love and Marital Satisfaction among the three age categories

The linear regression analysis showed that compassionate love is correlated with marital satisfaction (*p<0.01*). Further, it showed a weak positive significant relationship between compassionate love and marital satisfaction among the three age categories: young-aged couples, middle-aged couples, and old-aged couples (*r=0.34, p<0.01* (M=28.9 SD=±3.07),

r=0.26, p =0.027 (M=43.8 SD=±4.17), *r=0.357, p=0.019* (M=54.8 SD=±2.63) respectively. Table 3 shows the *r* values and the *p* values of these age category groups. The scatter plot related to the young-aged category (figure 1), middle-aged category (figure 2), and old-aged category (figure 3) is also depicted.

Table 3: *Linear Regression Analysis on compassionate love and Marital Satisfaction in three age groups*

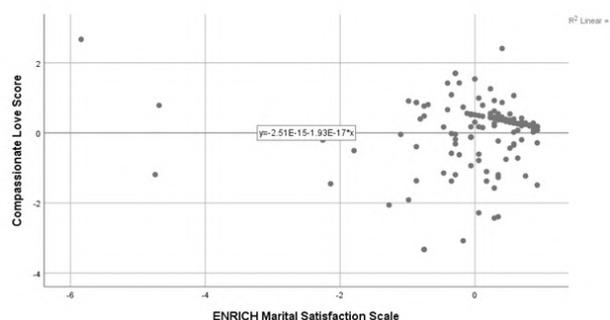| Variables	R-value	P value
Young aged couples	0.342	*0.01 **
Middle-aged couples	0.269	0.027*
Old-aged couples	0.357	0.019*

*P≤ 0.05

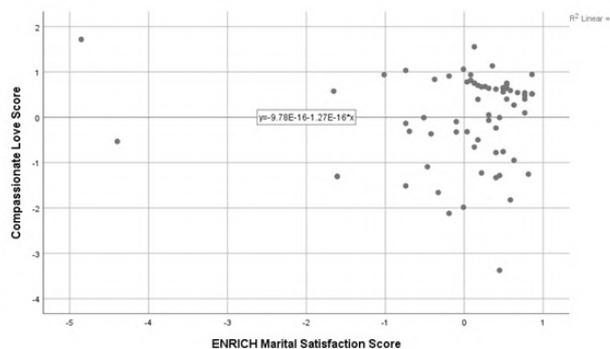*Figure 1*: Young-aged-category
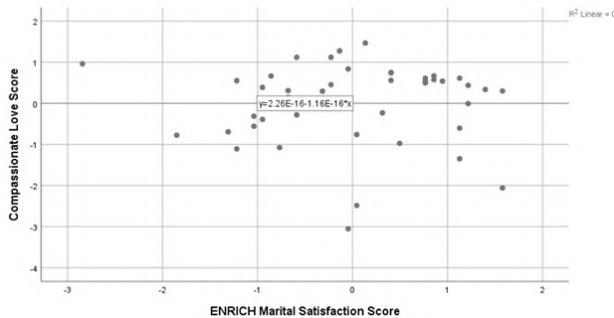

Figure 2: Middle-aged category

Figure 3: Old-aged category

Discussion

The current study revealed that most individual married couples show high compassionate love. Similarly, most individual married couples also show marital satisfaction. Further, the linear regression test conducted in the current study revealed that compassionate love shows a weak positive significant correlation with marital satisfaction among young-aged couples, middle-aged couples, and old-aged couples.

Neff and Karney (2009) have shown that only a subset of newlywed couples showed a positive global view of their partners, they were accurate in their perception of understanding each other, and these couples seem to engage in compassionate love in their marriage. However, the current study has not only focused on compassionate love in marital satisfaction among young-aged couples but also among middle-aged and old-aged couples. Further, Williamson & Lavner (2021) has shown that most spouses (Mean age for women 26.3 ($SD = \pm5.0$) and mean age for men 27.9 ($SD = \pm5.8$) show marital satisfaction during the newlywed years and the current study also shows marital satisfaction among the individual married couples in the young-aged category (M=28.9 SD=±3.07).

However, scarcely any previous works of literature have been researched focusing on middle-aged couples whereas the current study has addressed the gap. Compared to young married couples ($p <0.01$), there seems to be a reduction in compassionate love among middle-aged couples ($p =0.027$) according to the current study. It may be due to two reasons. One reason is the smaller number of middle-aged samples compared to the young-aged sample. The other reason is the challenges and barriers in the marriage and midlife years. Middle age is an important stage in human life where people engage in work life, marital life, and personal life. Moreover, the middle age period of life needs adjustment in relationships which is a great challenge. Some of these challenges are inter-generational ties, relationships with in-laws, nest syndrome, and boomerang generation (Benokraitis, 2015). It is surprising those middle-aged married couples who responded show compassionate love positively influences their life in the current study. From the responses to the questionnaires, it can be understood that they adjust well to their most challenging period of life while maintaining marital satisfaction.

Moreover, Eva Kahana et al. (2020) examined the impact of compassionate love on older couples' later-life psychological well-being. The study result showed an increased feeling of being loved and love for others and it has led to the reduction of depressive symptoms and the expression of high positive feelings. The current study has also emphasized the impact of compassionate love on marital satisfaction among old-aged couples.

Overall, the current study showed compassionate love is correlated with marital satisfaction among the three age categories, namely young-aged couples, middle-aged couples, and old-aged couples, and the previous studies have proven it. Further, this study is unique in that it addressed

the gap in the literature by examining the impact of compassionate love on marital satisfaction among middle-aged couples.

Conclusion

The findings of the current study showed that compassionate love is an important factor that increases marital satisfaction among married couples in the three age categories. Research on the concept of compassionate love is new to the field of psychology in Sri Lanka. This study will be useful in the psychology field to emphasize the importance of compassionate love which helps to create a successful family life while dissolving problems that arise in a family and forming long-lasting relationships.

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Original Article

The association between personality traits and friendship satisfaction among undergraduates of universities in Colombo district, Sri Lanka

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Abstract

Background: Humans aspire to establish fulfilling friendships because the overall quality of friendship predicts psychological well-being. The quality of friendships can predict happiness, yet it can also be linked to unpleasant situations like conflict and betrayal. Many people, however, find it difficult to establish lasting and fulfilling connections.

Objective: The main objective of the present study is to determine the relationship between personality traits and friendship satisfaction among undergraduates in the Colombo area.

Methodology: A descriptive cross-sectional study was conducted among undergraduates in the Colombo area. A sample of 144 undergraduates completed an online questionnaire comprising the Big Five Personality Inventory (BFI) and McGill Friendship Satisfaction Questionnaire. The linear regression analysis was carried out using SPSS version 26.

Results: The sample included 93 females (64.6%), and 50 males (34.7%) aged between 20 to 40 years (Mean age - 24 ± 2.7). The results revealed a significant correlation between extraversion ($r = +0.336$, $p<0.001$), agreeableness ($r = +0.226$, $p=0.006$), openness ($r = +0.268$, $p=0.001$), and friendship satisfaction. Out of the Big Five traits, neuroticism ($r = +0.070$, $p = 0.404$) and conscientiousness ($r = +0.114$, $p =0.175$) were not significantly correlated with friendship satisfaction.

Conclusion: Findings conclude that some personality traits (extraversion, agreeableness, and openness) were correlated with friendship satisfaction.

Keywords: Personality, Big Five personality traits, Friendship satisfaction, Undergraduates

Introduction

People develop friendships throughout their lives which is crucial in all social interactions. Friendship is a voluntary, casual and enjoyable relationship that people establish and should be mutual (Wilson, Harris, & Vazire, 2015). Almost everyone invests time, money, emotions, and energy in their friendships. Friendships tend to be closer or more intimate, particularly among people from collectivist cultures like Sri Lankan culture (French et al., 2006). It is even important from an evolutionary standpoint because it is crucial to human life and reproduction. However, many individuals find it challenging to build enduring and fulfilling friendships. Questions about how and who can develop and sustain fulfilling friendships arise, considering how vital friendships are on a broad scale. It has been shown that friendship quality predicts mental well-being, significantly impacting university lives and life satisfaction among undergraduates (Buote et al., 2007; Cheung & McBride-Chang, 2014; Gleckel, 2015; Amati et al., 2018; Pradhan et al., 2018;). University life is more like a rollercoaster ride for most undergraduates and maintaining psychological well-being is crucial. People make new friends in their undergraduate life and such satisfying peer relationships would be a great emotional and psychological support to adapt and cope with all academic and life challenges. Therefore, studying how personality traits correlate with friendship satisfaction among undergraduates would be useful for them to find satisfying friendships.

Unlike familial bonds, friendships are formed out of an individual's choice. Therefore, personality plays an important role when forming friendships, maintaining the quality of friendships, and even ending relationships (Wilson, Harris, & Vazire, 2015). According to the PERSOC framework (framework of Personality and Social relationships) how people interact with others is a significant reflection of our personality. It impacts how many and what kind of social interactions an individual forms (Back, et al., 2011). The Big Five Personality Inventory is one of the most used personality assessing tools throughout the literature (Wilson, Harris, & Vazire, 2015; Selfhout, et al., 2010).

The Big Five-factor theory proposes five major personality traits: neuroticism, conscientiousness, openness to experience, agreeableness, and extraversion, which can be identified through social interactions. Extraversion refers to a person's capacity for social interaction and ease in making new acquaintances in unfamiliar situations (Harris & Vazire, 2016; Anderson, John, Keltner, & Kring, 2001). Agreeability is a gauge of how people interact with others; for example, those with high agreeableness are more likely to be benevolent and straightforward. It has been demonstrated that certain traits that support the agreeableness trait, like friendliness, warmth, and companionship, have a beneficial influence on interpersonal encounters (Harris & Vazire, 2016).

People's propensity or willingness to try novel things is referred to as openness to experience. People who are open to new experiences can sustain friendships without having to communicate all the time, and even a short period is sufficient to build a bond. People's capacity for self-control to exhibit the desired behaviour is defined by their degree of conscientiousness. Consequently, they act in a socially appropriate manner, improving social interactions. The Big Five-factor theory's description of neuroticism, which centers on people's emotional stability based on how they view the world, is the last one. These individuals frequently lack the necessary emotional support for their friends and are easily irritated, impulsive, and quick to hold grudges (Mund, Jeronimus, & Neyer, 2018).

Environmental factors like culture and internal variables like individual differences influence how friendship works (Hinde, 1987;Nelson, Thorne, & Shapiro, 2011; Hinde, 1987; Greenfield & Suzuki, 1998). In an individualistic society, individuality, freedom, and self-realisation are essential, and the community is prioritised over individual goals in collectivist

cultures. These principles are crucial to human interactions. Even though a person's social functioning and interactions with peers are greatly influenced by their cultural context, research on peer relationships has typically concentrated on Western culture, especially in North America (Chen, French, & Schneider, 2006). Therefore, the findings of those studies might not be entirely applicable to Sri Lankan society. The present study's topic has not been reported in previous studies in Sri Lanka, hence would fill the research gap.

Understanding how personality influences friendship formation, upkeep, and termination can offer fresh perspectives on the most crucial steps to avoid negative interpersonal phenomena and interventions from altering inappropriate behaviour of one's relationship. Another significance is that knowing these processes and using them to guide relationships can enhance people's lives without coercion and altering the personality traits that govern these processes (Wilson, Harris, & Vazire, 2015). However, compared to romantic relationship satisfaction, which has been extensively researched in the past, friendship satisfaction has received less worldwide attention. Therefore, the present study aimed to investigate the relationship between personality traits and friendship satisfaction among undergraduates in the Colombo district.

Methodology

A descriptive cross-sectional study was conducted among 144 undergraduates in the Colombo district to find the association between personality traits and friendship satisfaction. The participants were recruited through convenient sampling with ethical approval (KIU/ERC/21/16) from the Ethics Review Committee of KIU. Inclusion criteria were volunteered undergraduates in Colombo who were free of psychological disorders and were in a friendship with someone from the same gender. The extension of this study would aim to find the personality combination that scores the highest friendship satisfaction. Hence, friends of similar sex were chosen to avoid the effect of gender variants.

Before the main study, a pretest was conducted utilising 25 undergraduates to validate the questionnaire before using it to collect data. The reliability analysis on the responses of the pretest provided satisfactory results for two sections of the questionnaire; section 2 (items of BFI) and section 3 (friendship satisfaction measuring items) (Cronbach's α; 0.969 & 0.745). Each item of the questionnaire was presented in three languages (English, Sinhala, and Tamil). Therefore, the data validity and clarity of questions were established using the feedback and comments from the participants of the pretest and subject and language experts.

The data collected via an online questionnaire consisted of three sections: demographic questions, BFI, and McGill Friendship Questionnaire. BFI is a self-report multidimensional personality assessing tool which consists of 44 items that have 1-5 likert phrases. The responses provided by participants would indicate where they fell on the spectrum for each personality trait; for instance, a score of a participant may indicate high extraversion but low conscientiousness (Fraga, 2018). Instead of framing a participant's personality into one category, this scale indicates where the individual stands in the spectrum of each personality trait. The median of each trait score was taken to identify whether participants are high or low in each trait. The median for each of the traits is as follows: extraversion (x~ 24), agreeableness (x~18), conscientiousness (x~18), openness (x~20), and neuroticism (x~16).

McGill Friendship Questionnaire consists of 4 subscales: affection, positive feelings, friendship satisfaction, and evaluation (Mendelson & Aboud, 2014). The subscale of the McGill Friendship Questionnaire that measures friendship satisfaction was used in the current study. This subscale contained ten liked items. Participants were advised to give their answers referring to one specific same-gender friendship.

The relationship between personality traits and friendship satisfaction was analysed using descriptive statistics and linear regression analysis using the SPSS 26 version.

Results

Participants were asked to select their gender under three categories; Male, Female, and Other (those who do not identify as male or female). The sample included 93 females (64.6%), 50 males (34.7%), and one other (0.7%) participant. The ages ranged from 20 to 40 years (Mean age = 24±2.7), and 104 (72.2%) represent non-state universities. According to the demographic data of the current study, 135 participants (93.8%) exhibited friendships that are longer than a year, and only 9 participants (6.3%) exhibited less than a year-long friendship.

Table 1: *Demographic details of the participants*

Variables	Frequency (n=144)	Percentage (%)
Age		
< 30 years	139	96.5
30+ years	5	3.5
Gender		
Male	50	34.7
Female	93	64.6
Other	1	0.7
Duration of the Friendship		
Less than a year	9	6.25
More than a year	135	93.75
Form of the University		
State University	40	27.8
Non-state University	104	72.2

Scores range from 8-40, 4-40, 4-40, 0-40, and 8-40, respectively, in each subscale; extraversion, agreeableness, conscientiousness, openness, and neuroticism of the Big Five Inventory. According to the frequency analysis of data collected from BFI, 76%(n=109) of participants in the current study show higher levels of extraversion (>24), 81%(n=117) show high conscientiousness (>18), 92%(n=132) present high openness (>20), and 58%(n=83) are with high neuroticism (>16) while everyone scores high in agreeableness (>18).
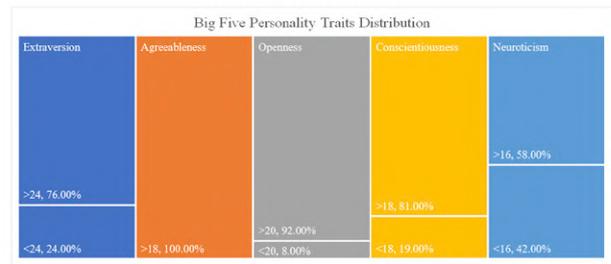
Figure 1 - Distribution of the Big Five personality traits

Linear regression has been carried out to understand the relationship between the Big Five personality traits and friendship satisfaction as well as the strength of each relationship. Extraversion ($r = +0.336$, $p < 0.01$)), openness ($r = +0.268$, $p = 0.001$), and agreeableness ($r = +0.226$, $p = 0.006$) showed a weak positive significant relationship with friendship satisfaction (Figure 2, Figure 3 & Figure 4) while the relationship of conscientiousness ($r = +0.114$, $p = 0.175$) and neuroticism ($r = +0.070$, $p = 0.404$) with friendship satisfaction proved to be insignificant in the current study.
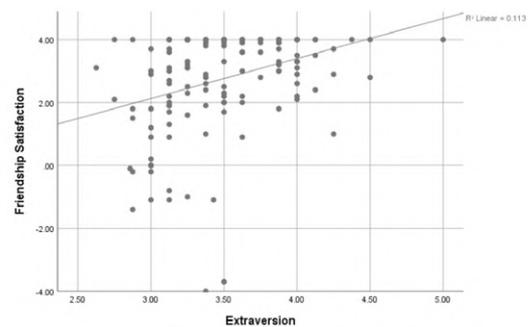
Figure 2 – Correlation between Extraversion and Friendship Satisfaction
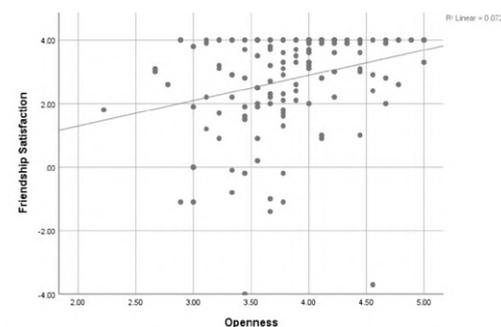
Figure 3 - Correlation between Openness and Friendship Satisfaction
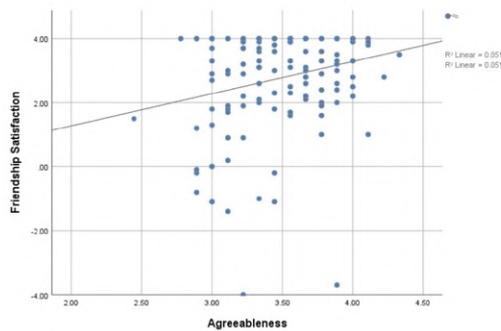
Figure 4 - Correlation between Agreeableness and Friendship Satisfaction

Discussion

This study investigated the relationship between the big five personality traits and friendship satisfaction as well as the strength of the relationship. According to the data analysis of the current study, extraversion, agreeableness, and openness were positively correlated with friendship satisfaction. Even though the above correlations were significant, it was not as strong as many previous studies (Jensen-Campbell, et al., 2002; Wilson, Harris, & Vazire, 2015). Although extraversion was found to be the strongest predictor of friendship satisfaction in earlier studies that used the same personality assessment instrument, the same tool has not been used to assess friendship satisfaction as in this study, which may account for the different results. Nevertheless, even in this research, extroversion showed the highest positive correlation out of all the other personality traits.

Asendorpf & Wilpers (1998) shows neuroticism is the strongest predictor of all subjective well-being indices. Even though neuroticism strongly correlates with friendship and romantic relationship satisfaction in literature (Wilson, Harris, & Vazire, 2015; Asendorpf & Wilpers, 1998; Demır & Weitekamp, 2006), it is not the case in friendship satisfaction according to the current study. That may be the case because personality might function differently in friendships and romantic relationships, even though both are interpersonal.

As same as the findings of the present study, consciousness showed a positive but insignificant correlation with friendship satisfaction in a previous study finding (Demır & Weitekamp, 2006). Moreover, findings have proven that the openness trait of personality significantly contributes to friendship satisfaction among undergraduates in Colombo, while most of the previous studies did not indicate any significant association between openness and friendship satisfaction (Wilson, Harris, & Vazire, 2015; Selfhout, et al., 2010). However, this correlation is not strong enough to see a contrast between the findings of past studies and present studies' findings.

However, all previous literature that has been used to compare with the findings of the current study is not from Sri Lanka since most research on peer relations has traditionally focused on Western culture, particularly in North America (Chen, French, & Schneider, 2006) and there were no reported studies conducted in Sri Lanka to compare the findings. Therefore, the contextual or cultural differences may have caused the contrasting findings since those findings might not be 100% applicable to Sri Lankan culture. Moreover, only a few studies directly examine how individual differences affect friendship satisfaction; most studies are on romantic relationships (Heller, Watson, & Ilies, 2004; Malouff, Thorsteinsson, Schutte, Bhullar, & Rooke, 2010; Schaffhuser, Allemand, & Martin, 2014).

The small sample size of the present study might be another cause of these mismatches between findings. That leads to a limitation of the present study, which eliminates the generalizability and limits the results' utility. Also, non-probability sampling (convenient sampling) caused the imbalance between the main gender categories, male and female, state and non-state universities, which again questions the generalizability. Therefore, future research shoul investigate co rrelation and other protential mediators like friendship quality and the number of interactions with friendship satisfaction.

Conclusion

It can be concluded that extraversion, agreeableness, and openness to novel experiences correlate with friendship satisfaction while the other two traits do not significantly contribute to friendship satisfaction. In Sri Lanka, the study of friendship satisfaction is relatively new. This research will be helpful in the field of psychology to highlight the significance of searching for mediators or factors influencing peer relationships that contribute to the development of satisfying friendships.

Acknowledgements

Conflicts of Interests

There are no conflicts of interest.

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Review Article

Role of molecular genetics in the preoperative diagnosis of thyroid tumors

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Abstract

Incidence of thyroid tumors has been triplicated in United States and other countries during the last three decades. There is a 2.1 fold increase of thyroid carcinoma from 2001 to 2010 in Sri Lanka. Though there is a higher incidence of thyroid tumors, their malignancy rate is low. Ultra Sound Scanning (USS) and fine needle aspiration cytology (FNAC) are used as the main pre-operative diagnostic methods. However, histopathological examination of surgical sections is used as the gold standard in determining the malignancy of the thyroid nodules. In order to prevent unnecessary surgeries and the re-operations, effective pre-operative diagnosis is important.

As most of other tumours, thyroid tumours too originated as a result of single or multiple genetic alterations or mutations of molecular markers like BRAF, RAS, RET/ PTC and TERT. These markers can be effectively used to determine the disease prognosis. The presence of any of these markers in the thyroid nodule represent a 100% positive predictive value and therefore it can be used for the clinical management of the patients. The use of molecular markers can significantly increase the diagnostic accuracy of thyroid malignancies. The combined use of molecular markers with the clinical findings and other pre surgical procedures including USS and FNAC can increase the diagnostic capability of the thyroid tumors. This can also be used for the individualized surgical approaches and post-surgical management of the patients.

Keywords: Thyroid Cancer, Genetic Alterations, Molecular Markers

Introduction

Over the past 30 years thyroid carcinoma incidence has triplicated in United States and other countries, and continue to increase globally. In Sri Lanka, there is a 2.1-fold increase of thyroid carcinoma from 2001 to 2010 (Jayarajah et al., 2018). Further, in Sri Lanka thyroid carcinoma has become the second commonest type of carcinoma affecting females more than males according to the latest cancer incidence data (Ceyran et al., 2015).

Though there is a high incidence (7% of the population) of thyroid tumors, the malignancy rate is about 5% of all the thyroid tumors (Mazeh, Mizrahi, Halle, & Ilyayev, 2011). Most of the tumours in thyroid gland are benign. Benign thyroid tumours include follicular adenoma which is the commonest type. Malignant neoplasms in thyroid gland include follicular thyroid carcinoma, papillary thyroid carcinoma (PTC), medullary carcinoma (C-cell carcinoma) and undifferentiated carcinoma. Apart from these epithelial tumours there are non-epithelial tumours such as malignant lymphomas, secondary tumours and tumour like lesions (DeLellis & Williams, 2004). Papillary thyroid carcinoma is the most common type of thyroid carcinoma accounting for 85-95% of all thyroid carcinomas (Ceyran et al., 2015, Demellawy et al., 2008, Pelizzo et al., 2006, Xing, 2013, X. Liu et al., 2014).

Several factors have affected the increased incidence of thyroid cancers. Increased use of pre surgical diagnostic methods like ultra sound scan to detect small thyroid tumours is one of the key factors affected for the rise in thyroid cancer incidence. Only 40% of the nodules which are below 1.5cm diameter can be detected by the physical examination (Davies & Welch, 2006, Kitahara & Sosa, 2016, Pellegriti et al.,2013). Exposure to radiation mainly during various medical diagnostic procedures is another factor associated with high incidence of thyroid tumors. Medical and dental diagnostic procedures like X-ray and CT scan has significantly affected the thyroid gland and thyroid gland is more prone to irradiation due to it's position in the body and it's ability of concentrating Iodine (States et al., 2008). High level of TSH and autoimmune thyroiditis conditions too have affected for the high incidence of thyroid cancers due to the production of pro inflammatory cytokines and the oxidative stress. However, successful treatment to these conditions can neutralize the effect from the TSH level and autoimmune thyroiditis conditions. Other than above facts obesity and insulin resistance has also affected for the increased incidence of thyroid tumors as insulin regulates the thyroid gene expression and stimulate the thyrocyte proliferation, differentiation and transformation. Diet, life style and exposing to other detected or undetected carcinogens have also affected for this (Kitahara & Sosa, 2016, Pellegriti et al., 2013).

Fine Needle Aspiration Cytology (FNAC) is a well-established technique used in preoperative diagnosis of thyroid tumors. FNAC is done radiology guided or by palpations. Main objective of conducting FNAC is to stratify patients with a risk of malignancy, subjecting them to surgeries and thus preventing unnecessary surgeries for benign nodules. However, sensitivity and specificity of this technique is low as individual cell morphologies are considered and also as there is a chance of missing micro carcinomas (Wright et al., 2008). Further, the main limitation of the FNAC technique is the indeterminate cytopathology results. According to the Bethesda system for reporting thyroid cytopathology, 20-30% of thyroid cases falls into 111, 1V and V categories which are considered as indeterminate or suspicious nodules. Also according to final pathological results in these indeterminate nodules, the malignancy rates range from 6-75% (Khan & Zeiger, 2020). Therefore, to detect whether the tumor is malignant or benign, pathological identification of tumors is done by the examination of routine Hematoxylin-Eosin stained tissue sections. However, for this process lobectomy or total thyroidectomy specimens are required. Though the surgeries are done on indeterminate nodules, only 20-30% of nodules contain malignant cells. Therefore, 80% of

the patients with inderminate thyroid nodules undergo unwanted surgeries (Mazeh, Mizrahi, Halle, & Ilyayev, 2011). Pre-operative accurate diagnosis of thyroid tumors are very important to determine disease prognosis and treatment plan.

As most other carcinomas, thyroid carcinoma too results due to the accumulation of multiple genetic and epigenetic alterations in the genome (Raman & Koenig, 2014). With the objective of improving the diagnostic capacity, gene mutation markers and gene expression panels are currently used. BRAF and RAS point mutations and RET/ PTC and PAX8/ PPARγ are considered as the common genetic alterations in the thyroid carcinoma. These mutations are non-overlapping and found in 70% of papillary and follicular thyroid carcinoma FNAC specimens and the surgically resected specimens. The use of molecular markers can significantly affect on increasing the diagnostic accuracy of thyroid carcinoma as the BRAF like markers can be used for the disease prognostication and some other markers can be used for the individualized management of the patients pre and post surgically (Nikiforov, 2011).

Common Genetic Mutations in Thyroid Malignancy
Somatic mutations, alterations of the gene expression, microRNA expression and gene promoter methylation have been reported as causes for thyroid cancers in the past few decades. These can be due to point mutations or due to chromosomal rearrangements (Nikiforov & Nikiforova, 2011).

Common sites where point mutations occur are BRAF gene and RAS gene while RET/PTC and PAX8-PPARγ result due to chromosomal rearrangements. Activation of MAPK and P13K-AKT signaling pathways by their mutations leads to tumorigenesis and subsequent occurrence of carcinoma. Activation of MAPK pathway is essential for the tumor initiation. The mutations that affect the P13K-AKT path way is important for the progression and differentiation of these tumors.
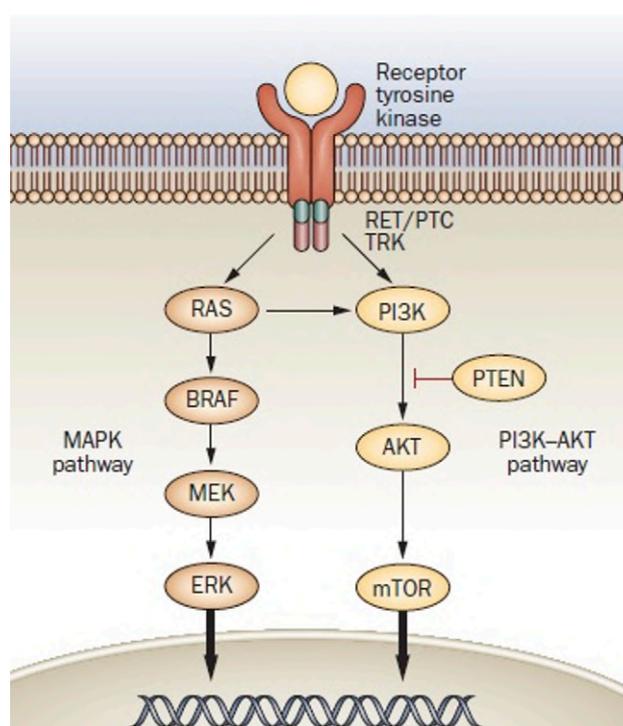
Figure1 - The main signaling pathways involved in thyroid carcinogenesis are the MAPK and PI3K–AKT pathways. These pathways are involved in propagation of signals from various cell membrane receptor tyrosine kinases into the nucleus, and they regulate multiple cell processes including proliferation, differentiation and survival. Activation of the MAPK pathway by oncogenic stimuli such as mutated BRAF, RAS or the chimeric fusion proteins RET/PTC and TRK is a common tumor initiating event in well differentiated papillary carcinoma and in some follicular carcinomas. Mutations involving the effectors of the PI3K–AKT pathway such as the PI3K subunit PIK3CA, AKT1 and PTEN are found more frequently in follicular carcinomas and in less differentiated types of thyroid cancer (Nikiforov & Nikiforova, 2011).

BRAF V600E mutation is considered as the most common type of mutation in thyroid cancers including papillary thyroid carcinoma with a rate of 99.3% (Raman & Koenig, 2014). This mutation is absent in the follicular variant of papillary thyroid carcinoma and the benign nodules (Trovisco et al., 2004). This mutation results due to the replacement of a glutamate

to valine amino acid at 600 residue (Val600Glu) as a result of the thymine to adenine substitution at 1799th position of this gene (Nikiforov & Nikiforova, 2011). This mainly happen around the nucleotide 600. BRAF gene mutation causes the production of BRAF-V600E mutant protein which activates the BRAF kinase and then MAPK signaling pathway. This point mutation gets positive in 15-40% of indeterminate thyroid cytology specimens and 40-45% of papillary thyroid carcinoma specimens. Although this marker has a high specificity, its sensitivity is low when used independently. Further, BRAF V600E gene is also used for the prognosis of the thyroid disease as this mutation is associated with the re-occurrence of the tumors and the mortality (Y. Liu et al., 2013, Soares et al., 2017, Xing, 2013). A significant association has been identified between the BRAF mutation and extra thyroidal invasion, lymph node metastasis and advanced tumor stages. This marker can also be used for the risk stratification of the thyroid tumors (Xing et al., 2005).

PAX8/ PPAR γ promotes the differentiated follicular thyroid neoplasia. This is due to a fusion between the paired domain transcription factor and the peroxisome proliferator – activated receptor genes [t (2;3)(q13;p25) chromosomal translocation] (Hsiao & Nikiforov, 2014). Thirty to thirty five percent (30-35%) of thyroid follicular carcinoma and the follicular variant papillary carcinoma carries the PAX8/ PPAR γ mutant protein. This act as a dominant negative inhibitor of PPAR γ or as a PPAR γ like transcription factor depending on the target gene and the cellular context. This mutant protein increases the growth rate of the cells and inhibit the apoptosis process (Raman et al., 2014). RAS mutation rarely get overlapped with this mutation as it has distinct pathogenetic pathways in the follicular thyroid carcinoma development. Presence of this marker in a follicular lesion doesn't confirm the malignancy. However, this can be used as an intensive tool for the vascular and capsular invasion (Bhaijee & Nikiforov, 2011).

TERT gene, the catalytic sub unit of the gene is responsible to keep the cells immotile by maintaining the telomere length at the end of chromosomes. Two mutations can occur in this TERT promoter region namely C228T and C250T leading to shortening of telomere length and thus increase the rate of cell replication and carcinogenesis. C250T gene mutation is rare. However, both C228T and C250T are mutually exclusive. This gene has been identified as the best marker of aggressiveness, poor prognosis and distance metastasis of all the types of thyroid carcinoma (Melo et al., 2014, Landa et al., 2013, X. Liu et al., 2014, Soares et al., 2017, X. Liu et al., 2013).

RET/ PTC is a chromosomal rearrangement that leads to cause papillary thyroid carcinoma at a significant rate. Currently the rate of RET/ PTC rearrangement is progressively decreasing. High frequency in this rearrangement is found in the children and the young adults who has an exposure to radiation (Hsiao & Nikiforov, 2014). Usually RET gene codes for the protein which is a signaling subunit of a receptor complex for ligands of the glial-derived neurotrophic factor (GFL) family and chimeric forms for this receptor develops due to this chromosomal rearrangement. There are about twelve (12) forms of this rearrangement. This is considered as a very early event in the development of thyroid malignancies as this mutation leads to the chronic activation of MAPK pathway. Moreover, this is present only in a small fraction of poorly differentiated thyroid cancers and also this oncoprotein may not confer a high risk of disease progression (Marrow et al., 2014). This RET gene acts on thyroid C cells and not on the follicular cells.

Second commonest type of mutation found in thyroid malignancies is the RAS mutation. There are three isoforms of RAS mutations namely NRAS, KRAS and HRAS. Among these three NRAS is the predominant one in thyroid tumors, specially in the follicular thyroid carcinoma. This mutation occurs in the codon 61 and 12. This RAS mutation activate both MAPK signaling pathway and the PI3K–AKT pathway and P13-AKT is involved in the tumorigenesis. RAS mutation is

seen in 40-50% follicular thyroid carcinoma and 10-20% of papillary thyroid carcinoma. Most of the RAS positive papillary thyroid carcinoma are follicular variant. Further, it is also positive in 20-40% of follicular thyroid adenoma. Basically these three markers present in follicular cell derived thyroid tumors and HRAS and NRAS can also be found in the medullary tumors (Hsiao & Nikiforov, 2014). The PPV of this mutation is comparatively low for cancer when considering other common mutations and translocations like BRAF, PAX8/ PPAR γ and RET/ PTC. Although this RAS mutation is positive in the Follicular adenomas there are reported evidences that these are present in precancerous stages which can transform into malignancies (Zhu et al., 2003).

PI3K/ AKT plays a major role in the thyroid tumour generation. It can be mainly affected by activating mutations in PIK3CA and AKT1 and inactivation of PTEN mutation. Somatic mutations in PTEN can be seen in follicular thyroid tumours and anaplastic thyroid carcinomas. Germline mutations in the PTEN gene can be seen in the thyroid follicular tumours in patients with Cowden syndrome(Hsiao & Nikiforov, 2014). From the two activating mutations, PIK3CA mutation occur in the 9 and 20 exons and it is found in follicular thyroid carcinomas, poorly differentiated thyroid carcinomas, and anaplastic thyroid carcinomas while AKT1 is seen in metastatic thyroid tumors (Hsiao & Nikiforov, 2014).

Diagnosis of common genetic mutations in thyroid tumours

Detection of genetic markers in the cytological indeterminate nodules play an important role in the accurate diagnosis of the thyroid tumors. As the pre-operative accurate diagnosis is crucial in the thyroid diseases, several panels of genetic mutations and the genetic expressions can be used. This can be accomplished with the use of next generation sequencing in which more than one mutation or a genetic expression can be diagnosed simultaneously. These expressions can be used for the diagnosis, prognosis and the therapeutic management of the patients. Panel

of gene mutations and gene expressions are currently used as the sensitivity is low when the markers used independently.

BRAF and RAS mutations and the RET/ PTC and PAX8/ PPARγ rearrangements are widely used for the diagnosis of thyroid malignancies. A high specificity and high positive predictive value was observed in any of the mutations which include BRAF, KRAS, HRAS, NRAS and RET/PTC1. RET/PTC3 and PAX8/ PPARγ. It has been found that the presence of any of the above mutations except the RAS mutation can be used as an indication for thyroidectomy (Buryk et at, 2013).

In the mutation negative thyroid nodules with atypia of Undetermined Significance/Follicular Lesion of Undetermined Significance (AUS/ FLUS), there is a malignancy risk of 6% and invasive carcinoma risk of 2.3% from the 14% prevalence of thyroid diseases. The negative predictive value of these AUS/ FLUS nodules is 94% which is a very high rate. Further, as there is a low chance of missing the nodules with a risk of malignancy and also as majority of missed nodules are intra-thyroidal, these molecular markers can be used to eliminate surgery of AUS/FLUS nodules which is a burden to the health care system (Nikiforov et al., 2011). Other than nodules with undetermined significance, panel of molecular markers aids in preventing 60% of the thyroidectomies or lobectomies in the children. This is due to the high specificity of the molecular markers in the diagnosis of thyroid nodules (Buryk et al. 2013).

Conclusion

The use of molecular markers can significantly increase the diagnostic accuracy of thyroid malignances. The combined use of molecular markers with the clinical findings and other pre surgical procedures including ultrasound scan and fine needle aspiration cytology could increase the diagnostic capability of the thyroid tumors. This can also use for the individualized surgical approaches and post-surgical management of the patients.

Conflict of interests:
Authors declare that there is no conflict of interests

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Original Article

Factors That Affect Consumers' Online Purchase Intention with Special Reference to Colombo District

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Abstract

Background: Due to the rise of e-businesses and e-commerce, the majority of consumers have shifted their purchasing habits from in-store to online shopping. In response to this trend, businesses in Sri Lanka are now offering both online and in-store shopping options for their customers. However, Sri Lankan customers have shown a lack of interest in online shopping.

Objective: This study aimed to identify the factors that influence consumers' intention to make online purchases.

Methodology: A quantitative research approach was employed using a structured questionnaire. A sample of 700 internet users from the Colombo district was selected through convenience sampling. The study examined subjective norms, attitude, and website usability as independent variables, and consumers' intention to make online purchases as the dependent variable. Data were analyzed using correlation and regression analyses.

Results: The study found that both attitude and website usability significantly and positively impact consumers' intention to make online purchases (r = .385, p =<0.001; r = .324, p =<0.001). However, subjective norms did not have a significant impact on consumers' online purchase intention (r = .056, p = 0.183).

Conclusion: Based on these findings, the study emphasizes the importance for organizations to shape their marketing strategies based on consumers' attitudes. Additionally, organizations should consider developing new products and services that are tailored to the online platform to attract customers.

Keywords: Attitude, Online Purchase intention, Subjective norms, Website usability

Introduction

With the introduction of the internet in the 1990s, it, has come to revolutionize the world paving way for industrial performance and daily life change of humans. Further emergence of the internet has made it easy to purchase products and services through the internet. This has been defined as E-commerce (Miles et al., 2006).

More than in the past, e-commerce has become a blessing for many customers and with the invention of new tools and technology, it has become easy to use e-commerce to fulfill customers' needs and wants. Since more consumers have access to the internet, the customer's perception regarding online purchasing has changed (Bhatti et al., 2020). More and more consumers have changed their purchasing behavior from their traditional ways to more internet-based due to the ease, comfort, convenience, cost-saving, and time-saving factors as compared to conventional or traditional shopping (Hooria, 2014). Improvement in information technology has elevated people's standard of living across the world. The sophisticated capabilities of this technology provide incredibly effective communication and access to accurate, reliable, and useful information, which is essential to manage the overall quality. In the industrialized world, ICT is becoming more and more prevalent in most critical economic contexts. Online shopping has a wide-reaching effect on all industries including business, travel, and the economy. Online purchasing practices also impact time censors. Moreover, online purchasing is mainly adopted by groceries, restaurants, etc. to deliver food items to customers' doorsteps (Bhatti et al., 2020). Online purchasing practices have affected both the private and public sectors. According to the statistics, soon, the digital literacy of younger generations (ages between 15-34 years old) will increase up to 40% - 65% when compared to other generations (Department of Census and Statistics, 2021).

According to the Department of Census and Statistics of Sri Lanka (2021), the internet penetration rate of Sri Lanka in 2019 was 33.5% and was low when compared to India (40.6%), Maldives (68.4%), and Indonesia (62.6%). In the Sri Lankan context, the Western province (45.9%) population uses the internet more than any other province. Further Colombo district has the highest number of people using internet. (Department of Census and Statistics, 2021).

Many merchants offer their products through online websites and has now become a major part of Sri Lankan Business. For numerous reasons, individuals now prefer to shop online as it is convenient. Nevertheless, Sri Lanka still lack financial records of such online sales. According to a previous study, consumer adoption of online purchasing is low in the Sri Lankan context (Wanniarachchi et al., 2017). Privacy and security concerns are the top most concerns for web users for not purchasing over the web (Godwin, 2001). On the other hand, consumers' lack of acceptance is not merely due to the concern about the security and privacy of their data but also due to the lack of trust and reliability of web vendors (Thaw, Mahmood, & Dominic, 2009). Furthermore, it is emphasized that customers do not have considerable awareness of online shopping. Hence, there exists a practical disparity between what merchants offer and consumers' knowledge regarding online shopping. Nevertheless, Sri Lanka possesses significant potential for the growth of online shopping if consumer awareness is enhanced. Due to the relatively new nature of online purchasing in Sri Lanka, there is limited existing research on consumers' intention to buy online. Therefore, the objective of this study was to fill this practical gap.

In the local and global context, previous researchers have used different theories to study consumers' online purchase behavior. The Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Theory of Planned behavior (TPB), Expectation-Confirmation Theory (ECT), and Unified Theory of Acceptance and Use of Technology (UTAUT) are significant

theories that have been used to study the consumer behavior.

Several researchers have used the extended and revised TPB models to increase the predictive and explanatory ability of TRA on human behavior (Zhang, 2018). The present study is based on the extended model of the Theory of Planned Behavior which explains the relationship between Attitude, Subjective Norms, Website Usability, and Purchase Intention. The intention is known to be an indicator to measure the degree of a customer's willingness to approach a certain behavior and how many attempts they try to perform a certain behavior (Rahi, Ghani, & Muhamed, 2017). Attitude is one of the main components used in the Theory of Planned Behavior to evaluate human behavior. It is a learned predisposition to behave in a consistently favorable or unfavorable way concerning a given object (Mengli, 2016), Subjective norms are another factor which is significant in evaluating human behavior. Subjective norms are perceived as pressure obligatory by others such as a neighbor, friends, or any person, who performs the behavior of interest (Ajzen & Fishbein, 1980). Website usability is a vital factor should be considered in line with online purchase intention. Website usability consists of simplicity, readability, consistency, interactivity, learnability, navigability, content relevance, supportability, and credibility factors (Perdana & Suzianti, 2015).

Methodology

Explanatory research design has been used in the study to explain the relationship among attitude, subjective norms, website usability, and online purchase intention while this research attempted to achieve the research objectives through hypothesis testing. Due to the rapid expansion of online shopping in the last few years, more customers have used online methods to purchase products to fulfill their requirements. Furthermore, due to the COVID restrictions and safety requirements, the researchers selected a convenient sampling method to collect data from the respondents. The researchers distributed a structured questionnaire among the respondents to collect the data.

According to the Hootsuite (2021) report, the Sri Lankan active internet users have been identified as 10.90 million. In Sri Lanka, the highest percentage of internet users has been recorded from the Colombo district. Therefore, the Colombo district's active internet users were selected as the study sample. Since the population of the study is more than 1,000,000, the sample size has been calculated as 700 by using Krejcie & Morgan, table. In this study, face validity was used to measure the validity of the instrument. The study has tested the constructed hypothesis of the study by using correlation analysis and regression analysis. The researchers used SPSS software to analyze the collected data set.

Results

In the data cleaning process, 535 responses were accepted for the analysis out of 700 responses (response rate 76.42%). Since the Skewness value (-0.720) is between -2 to +2 and the Kurtosis value (1.302) is between -7 to +7 the data set has been identified as normally distributed. According to Table 1, Cronbach's Alpha values of all variables are above 0.7 (Sekaran & Bougie, 2016). Therefore, all the variables are reported as reliable.

Table 1: Test of Reliability

Variable	Cronbach's alpha value	Number of items	Comment
Attitude	.912	7	Accepted
Subjective Norms	.827	4	Accepted
Website Usability	.900	6	Accepted
Online purchase intention	.874	8	Accepted

(Source: Survey Data 2021)

Out of the 700 complete cases, 66% (n=462) are male, and 33% (n=238) are female. The respondents' age is significantly different in each social group. A large number (n=259, 37%) of the respondents are in the age group of 26-35, while 32 % (n=224) are represented by the age group of 18-25. The remaining 8% (n=56) and 23% (n=161) belong to the age group of above 46 and

between 36-45 respectively. According to the results of the study, 49% (n=343) of respondents completed their G.C.E A/L while 28% (n=196) of respondents were diploma holders. Further 23% (n=161) of respondents were graduates. With regards to the Monthly Income respondents in this study frame, who hold a monthly family income between 25,000-39,999 were 49% (n=343), while respondents, who hold a monthly family income between 40,000 and 54,999 were 24% (n=168). Moreover, 10% (n=70) of the respondents hold a monthly family income above 55,000 and 17% (n=119) of respondents were below the income of 25,000.

Table 2: Descriptive Statistics

Variable	N	Mean	Std. Deviation
Attitude	535	3.4280	0.67935
Subjective Norms	535	3.4150	0.76101
Website Usability	535	3.5268	0.73877
Intention to online shopping	535	3.3315	0.69545

(Source: Survey Data 2021)

The mean value for the consumer intention to online shopping was 3.33±0.69 (table 2)
Overall, the mean values of all variables are more than 3 and it indicates that variables are performing up to the standard level.

Pearson's correlation coefficient for attitude is between 0.5 and 0.8 (0.710) which is a moderate degree of the positive relationship between attitudes and consumers' online purchase intention. Furthermore, Pearson's correlation coefficient for subjective norms indicates 0.593 and it is directed to identify a moderate degree of a positive relationship between the subjective norms and consumers' online purchase intention. Pearson's correlation coefficient of website usability indicates a 0.709 value, and it also recorded a moderate degree of a positive relationship between website usability and consumers' online purchase intention.

According to the analysis of the study, the ANOVA table p-value is 0.000 (< 0.05) the model can be identified as significant. Furthermore, according to table 03, p-values of attitude and website usability indicate 0.000 value. Since it is

less than 0.05, the impact of attitude and website usability on customers' online purchase intention has been identified as significant. But the p-value of the subjective norms is 0.183 and it is not less than 0.05. Therefore, the impact of subjective norms on customers' online purchase intention cannot be identified as significant.

Furthermore, concerning table 03, the following regression equation can be created using the beta coefficient

Table 3: The coefficient table of variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	.677	.108		6.270	0.000
Attitude	.385	.057	.376	6.795	.000
Subjective Norms	.056	.042	.062	1.334	.183
Website Usability	.324	.057	.344	5.672	.000

(Source: Survey Data, 2021)

Y (Consumers' online purchase intention) = $0.677 + 0.385A + 0.324WU + e$

According to the regression equation, it has been concluded that when the attitude (A) increases by one unit the consumers' online purchase intention will be increased by 0. 385, and when the website usability (WU) increases by one unit the consumers' online purchase intention will be increased by 0. 324. The R-Square value is 0.547, which means 54% of the variation in customers' online purchase intention can be explained by attitude and website usability. In the current study, hypotheses have been tested by using correlation analysis and regression analysis at a 95% of the confidence interval.

Based on the analysis conducted, the study ultimately found that consumers' online purchase intention is significantly influenced by attitude

Table 4: Summary of Hypothesis Testing of the Study

No	Hypothesis	P value	Result
H1	Attitude has a significant impact on consumers' online purchase intention	0.000	Accepted
H2	Subjective Norms have a significant impact on consumers' online purchase intention	0.183	Rejected
H3	Website Usability has a significant impact on consumers' online purchase intention	0.000	Accepted

(Source: Survey Data, 2021)

and website usability, while subjective norms do not have a significant impact. Therefore, it can be concluded that website usability and consumer attitudes play a crucial role in influencing individuals in the Colombo district to make online purchases.

Discussion

The primary objective of the present research is to investigate the influence of three key factors, namely attitude, subjective norms, and website usability, on consumers' intention to make purchases online. The findings of the study indicate that attitude plays the most significant role in shaping consumers' online purchase intention (B = .385). This outcome is supported by previous literature, which has demonstrated the significant impact of attitude on customers' intention to purchase online (Peña-García, Gil-Saura, Rodríguez-Orejuela, & Siqueira-Junior, 2020). Previous research by Alam & Sayuti (2011) has also highlighted a direct positive relationship between attitude and intentional behavior, emphasizing that customers' attitude directly influences their online purchasing behavior. Moreover, a study conducted in 2002 (Karjaluoto, Mattila, and Pento, 2002) revealed that trust in online stores,

The study has concluded that attitude and website usability has a significant positive impact on consumers' online purchase intention while subjective norms do not have a significant impact on consumers' online purchase intention. Since the findings of the study elaborate a significant impact of attitude and website usability on online purchase intention, as such, it can be stated that website usability and consumer attitudes are most important in influencing clients in the Colombo district to make an online purchase.

Perceived ease of use, perceived usefulness, and attitude toward online purchasing have a positive relationship, while perceived risk is negatively related to attitude. Consequently, individuals make choices and decisions based on their attitude, which in turn influences their purchase intention, depending on their different attitudes.

The positive impact on customers' intention to purchase online is influenced by the usability of a website. Consumers' online purchase intention is linked to the usability of an online website (Childers, Carr, & Peck, 2001). Additionally, the primary gateway to attract customers and exert greater influence on online shopping is the design of the website (Lim, Lim, & Trakulmaykee, 2011). Previous studies indicate that customers not only prioritize the design and interface of a website but also consider its ease of use (Belanche, Casaló, & Guinalíu, 2012). Before making a purchase, individuals prefer to obtain genuine and trustworthy information from the source.

According to a study conducted by Khalil and Pearson in 2008, the presence of family members and colleagues as subjective norms positively affects individuals' inclination to make online purchases. In a separate study by Hasbullah et al. in 2015, it was emphasized that social interaction and interrelation play a crucial role in predicting high levels of satisfaction with online shopping. Additionally, the researchers found that social influences stem from subjective norms, which encompass consumers' perceptions of other consumers' beliefs, while subjective norms themselves have only a minor impact on individuals' intentions to engage in online shopping. Furthermore, the researchers confirmed a significant correlation between discussing online shopping with friends and the intention to shop online (Hasbullah et al., 2015).

Nevertheless, the results underscored that subjective norms have not exerted a substantial influence on customers' intention to make online purchases. As customers increasingly make independent decisions regarding their purchases, subjective norms may not hold significant sway over their online purchase intentions. Instead, it is likely that other factors play a more influential role in shaping customers' inclination to make online purchases (Irawan & Hurriyati, 2020).

Conclusion

In conclusion, this research study has shed light on the various factors that significantly impact consumers' online purchase intention, specifically in the Colombo District. The findings of this study provide valuable insights into the factors that influence consumers' decision-making process in online shopping, contributing to the existing body of knowledge in the field of e-commerce. Online shopping is an increasingly important aspect of the modern economy, playing a crucial role in its growth. The findings of the study indicate that consumers' intention to make online purchases in the Colombo district is significantly influenced by their attitude and the usability of the websites they visit. However, subjective norms do not have a significant impact in this regard. Given that attitude is identified as the most influential factor affecting consumers' online purchase intention, organizations should focus on developing effective marketing and promotional strategies to alter customers' perceptions and attitudes towards online shopping, thereby optimizing their overall performance. Additionally, it is crucial to regularly assess and monitor customers' attitudes to gain a deeper understanding of changes in consumer behavior. Based on these attitudes, organizations can tailor their marketing strategies accordingly. Furthermore, organizations should strive to create user-friendly and visually appealing websites to enhance customer retention and encourage increased time spent on the site, ultimately positively impacting consumers' purchase intentions. Overall, this research study sheds light on the factors that influence consumers' online purchase intention in the Colombo district. By understanding and leveraging these factors, businesses can develop effective marketing and website design strategies that enhance consumers' attitudes towards online shopping and ultimately drive their intention to make purchases online.

Future research directions

The current research proposes methods to identify more influential factors that impact consumers' inclination to make repeated online purchases. To gain a deeper understanding of consumer behavior and acquire further knowledge about the online business landscape, it is advisable to expand the study on a larger scale. It is recommended to conduct the research in other districts of the country in order to obtain more insightful findings. While subjective norms did not emerge as a significant factor influencing consumers' online purchase intention in this study, it is essential for businesses to consider broader social influences and cultural factors that may play a role in shaping consumers' attitudes towards online shopping. Conducting further research to explore these aspects could provide valuable insights for businesses aiming to tailor their strategies to the specific context of the Colombo district.

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