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FACULTY OF MEDICAL SCIENCES UNIVERSITY OF SRI JAYEWARDENEPURA



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Contents

Curatio Volume 04, No. 01, June 2024



Leading Article	1. Compassion and Empathy in Healthcare: Bridging Science and	
	Shehan Silva Page 4	
Original Article	2. A study on the clinically significant hypoglycaemia among patients with Diabetes Mellitus Type 2 attending the clinics of the professorial medical unit of Colombo South Teaching Hospital Kalubowila Gunathilake S.H., Subasinghe H.S, Silva F.H.D.S Page 9	
	3. Knowledge and Associated Factors of Knowledge on Autism Spectrum Disorder Among Preschool Educators in Colombo, Sri Lanka Gunawardena L G A S, Perera M N, Premadasa C Y, Gunawardana D I, Fernando H M, Senaratna C, Wijesekara S Page 27	
	3. Child Sexual Abuse: Maternal Knowledge, Consequences and Prevention Strategies in Child Welfare Clinics of Southern Sri Lanka Hasinika A P D, Dhammearatchi K, Ariyarathne H T D W Page 36	
	5. Knowledge of insulin therapy, emergency management, chronic complications and their associated factors among adult patients with type 1 diabetes attending the National Diabetes Centre Rajagiriya Hathurusinghe H D W P, Saranga M A I, Mylvaganam P, Nirmanie G N, Weeratunga C S, Arambewela M H, Wijesuriya M, Goonewardena C S E Page 48	
Perspective	 9. Peer-assisted learning: a perspective of an Asian Medical School Indrakumar J, Matthias A T, Yogendranathan N, Piyarathna C, Kaluarachchi T R, Gunatilake S B, Navaretnam S Page 57 	

General Information

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Cover Page: Disara De Silva (Student-32nd Batch, FMS, USJ) Cover story: Genetic research drives modern medicine, revolutionizing diagnostics and treatment. Advances in gene therapy and biotechnology enabled personalised care, offering hope for once incurable disease. As precision medicine evolves, cutting edge innovations push medical boundaries, tailoring medical treatment to individual genetic profiles. the future of healthcare lies in harnessing genetic science to unlock transformative therapies and shape the next era of medicine

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Compassion and Empathy in Healthcare: Bridging Science and Humanity

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Comfort Always?

Healthcare, a profession of paradoxes demands rigorous scientific precision as well as a profound understanding of human emotion and vulnerability. The synthesis of these elements defines the art of medicine. Empathy and compassion, far from being mere add-ons to clinical expertise, serve as foundational principles that can significantly influence patient outcomes. These qualities allow healthcare professionals to see beyond the symptoms, diagnoses, and treatment regimens to engage with patients as individuals with unique stories, fears, and hopes. As technology advances, the focus on efficiency often threatens to depersonalize healthcare. From roboticassisted surgeries to artificial intelligence in diagnostics, modern medicine increasingly emphasizes technological precision.

However, this shift poses the risk of diminishing the human connection essential to healing. A patient may marvel at the accuracy of a machine-generated diagnosis but still crave the warmth of a reassuring conversation with a caregiver. The adage 'comfort always' highlights the timeless need for human touch amidst technological progress. The challenge lies in integrating empathy and compassion into modern clinical settings without compromising efficiency or accuracy. Patients who perceive their healthcare providers as empathetic are more likely to adhere to treatment plans, leading to better health outcomes. Furthermore empathetic communication reduced hospital readmissions. This is a compelling argument for embedding emotional intelligence in medical education and practice.

Understanding Sympathy, Empathy, and Compassion

The nuances between sympathy, empathy, and compassion are critical to understanding their application in healthcare. Sympathy, while heartfelt, often creates a one-sided dynamic. Pity, which frequently accompanies sympathy, may unintentionally undermine a patient's sense of dignity. For instance, saying, "I'm sorry this is happening to you," acknowledges pain but lacks the depth to foster meaningful connection or action.

Empathy, by contrast, requires a deeper emotional engagement. It involves imagining oneself in another's situation, experiencing their feelings, and responding with understanding. Empathy, however, is not without challenges. Continuous exposure to patients' suffering can lead to what psychologists term "empathic distress." This phenomenon, if unchecked, may result in burnout, decreased job satisfaction, and even withdrawal from patient interactions.

Compassion takes empathy a step further. It combines emotional resonance with а commitment to action. Compassionate care not only recognizes and feels another's pain but actively seeks to alleviate it. This distinction is pivotal in healthcare. For example, а compassionate nurse doesn't stop at acknowledging a patient's anxiety; they work to address it by explaining procedures in layman's terms or offering emotional support.

Moral Distress and Compassion Fatigue

Empathic distress, if not managed, can be debilitating. Healthcare professionals often report feelings of helplessness and frustration when they are unable to alleviate suffering. Implementing coping strategies, such as mindfulness or debriefing sessions, can mitigate these effects. Healthcare is fraught with ethical dilemmas where compassion intersects with professional obligations. For instance, consider the allocation of limited resources such as ICU beds or organ transplants. While compassion may drive a provider to advocate for a particular patient, ethical principles like justice require equitable distribution. Balancing these competing priorities demands nuanced judgment and a robust ethical framework.

Moral distress arises when external constraints prevent healthcare providers from acting in line with their ethical beliefs. A poignant example is end-of-life care in settings with conflicting legal, cultural, and personal perspectives. In countries like Sri Lanka, where euthanasia is not legally sanctioned, healthcare providers may feel torn between their professional responsibilities and the compassionate desire to honour a patient's wishes.



Figure 1. Sympathy, empathy and compassion

Such situations can lead to profound emotional turmoil. Providers may feel they are failing in their duty to alleviate suffering, a core tenet of compassionate care. Over time, unresolved moral distress can contribute to burnout, withdrawal from patient care, or even career abandonment. To mitigate moral distress, healthcare institutions must foster environments that allow providers to voice their concerns and seek guidance. Regular ethics rounds, debriefing sessions, and peer support groups are invaluable in providing spaces for reflection and emotional processing. Additionally, institutions can offer resources such as access to ethics consultants or counsellors trained to navigate complex moral dilemmas.

Compassion fatigue, often misunderstood as a byproduct of caring too much (the cost of caring), is more accurately attributed to systemic failings such as understaffing and excessive workloads. Addressing these issues institutional requires changes. such as adequate staffing, fair compensation, and caregivers. mental health support for Compassion does not cause fatigue. However fatigue inability causes the to be compassionate. This underscores the need for systemic interventions to address root causes. The healthcare system itself often acts as a barrier to compassionate care, with time constraints, burnout, and a culture that does not prioritize compassion being a significant obstacle. As an example when a doctor is responsible for caring for too many patients in a shift, his ability to engage compassionately diminishes, not because they lack empathy but because the structural demands of their job make it impossible. Addressing compassion fatique. therefore, requires systemic interventions. Adequate staffing, manageable workloads, fair compensation, and access to mental health resources are essential components of fostering an environment where compassion can thrive.

While systemic change is critical, healthcare professionals can also adopt individual strategies to build resilience. Mindfulness practices, regular self-care routines, and professional boundaries are essential tools. For instance, a doctor who feels emotionally drained after a particularly challenging shift might benefit from mindfulness exercises to recentre and recharge. Similarly, engaging in reflective writing or seeking peer support can help caregivers process their emotions and maintain their ability to connect compassionately with patients.

A Case Study

A 65-year-old patient with terminal cancer is admitted to the ICU with severe respiratory distress. Despite the clear progression of the disease, the patient's family insists on aggressive treatment, hoping for a miracle. The attending physician, however, believes that palliative care would better serve the patient by prioritizing comfort and dignity over invasive procedures that are unlikely to improve outcomes. This situation highlights a profound ethical conflict. On one hand, compassion for the family might lead the physician to honour their wishes, respecting their emotional need to exhaust every possible option. On the other hand, the principle of beneficence demands that the physician recommend the course of action that aligns with the patient's best interests and minimizes harm. Nonmaleficence, or "do no harm," further supports the physician's reluctance to pursue aggressive interventions that could prolong suffering.

Resolving such dilemmas requires clear communication, empathy, and ethical reasoning:

- 1. Engaging with the Family: The physician might begin by acknowledging the family's fears and hopes, demonstrating empathy for their emotional state. Active listening and open-ended questions can help the family feel heard and respected.
- 2. Providing Clarity: Using plain language, the physician can explain the patient's prognosis, the likely outcomes of aggressive treatment, and the benefits of palliative care. Providing this information transparently helps the family make informed decisions.
- 3. Invoking Ethical Principles: The physician can articulate the ethical reasoning behind their recommendations, emphasizing the importance of the patient's comfort and dignity.
- 4. Collaborative Decision-Making: Involving the family in the decision-making process fosters trust and reduces the likelihood of conflict. If necessary, the physician might enlist the help of an ethics committee or palliative care specialist to mediate the discussion.

The Spiritual and Aesthetic Foundations of Compassion

All across cultures emphasize compassion as a care. Buddhism's *Metta* teaches universal lovingkindness, while Christianity's *Agape* embodies unconditional love. These teachings offer profound insights into the caregiver-patient relationship. Art and literature have long celebrated the power of compassion in healing. The Good Samaritan parable illustrates the importance of transcending cultural and social barriers to alleviate suffering. Similarly, the Buddha's account of ministering to the Puttigatissa emphasize the holistic nature of care. These narratives remind healthcare providers that their role extends beyond physical healing to addressing emotional and needs. Spiritual practices like spiritual mindfulness and gratitude journaling are increasingly being integrated into healthcare training programs. These practices enhance caregivers' ability to stay present, reduce stress, and maintain a compassionate outlook.

Integrating Compassion into Clinical Practice

Empathy training programs have gained traction in medical education. Role-playing exercises, reflective writing, and narrative medicine are effective tools for cultivating emotional intelligence. For instance, medical students who participate in reflective writing workshops often report greater understanding of their patients' perspectives and improved communication skills. Programs focusing on communication and relational skills can enhance the therapeutic alliance and make compassion skills more tangible for healthcare providers.

Creating a culture of compassion requires systemic change. Hospitals must implement policies that prioritize patient-centred care while supporting staff well-being. As an example, introducing flexible schedules, providing mental health resources, and fostering a supportive work environment can mitigate burnout and compassion fatigue. Effective compassion interventions should span organizational levels, focusing on building connections and cultural safety. Leadership involvement is crucial for transforming healthcare culture and promoting compassion as a core value. Encouraging selfcare and providing role models can facilitate the cultivation of compassion among medical students and professionals

Challenges in Fostering Compassion

Cultural attitudes toward emotional expression can influence the delivery of compassionate care. In some societies, stoicism is valued, making it challenging for caregivers to gauge and respond to patients' emotional needs. Training programs that address cultural competence can help healthcare providers navigate these complexities. Systemic barriers, such as time constraints and bureaucratic pressures, also hinder compassionate care. Overcoming these obstacles requires rethinking healthcare delivery models to prioritize meaningful patient interactions.

Implicit biases can undermine compassionate care, leading to disparities in treatment. Ongoing training in cultural humility and bias recognition is essential for ensuring equitable care. Studies show that healthcare providers who engage in regular self-reflection are better equipped to recognize and address their biases.

Expanding Ethical Support in Healthcare

Ultimately, addressing the ethical challenges of compassionate care requires both systemic and individual interventions. Healthcare institutions must prioritize ethics training, provide forums for discussion, and ensure that policies support both patients and caregivers. Simultaneously, caregivers must cultivate emotional resilience and seek support when navigating morally complex situations. The integration of empathy, ethical reasoning, and professional judgment ensures that healthcare remains not only scientifically advanced but also profoundly humane. By addressing moral distress and fostering environments where compassion can flourish, the healthcare community can uphold its commitment to alleviate suffering and restore dignity, even in the face of the most challenging ethical dilemmas.

Compassion fosters not only professional excellence but also personal growth. By engaging deeply with patients, healthcare providers often develop a broader perspective on life, enhancing their emotional resilience. This growth benefits not only their patients but also their relationships outside of work. Studies have also shown that compassionate care leads to improved patient outcomes. Patients perceive who their caregivers as compassionate experience lower levels of pain and anxiety, adhere more faithfully to treatment plans, and report higher satisfaction with their care.

Conclusion: A Call to Action

Compassion and empathy are indispensable in healthcare. They are not mere ideals but practical tools that enhance patient care and caregiver well-being. However, fostering these qualities requires a collective effort—from individual caregivers to institutional leaders. This philosophy should guide every aspect of medical practice, ensuring that the human element remains central in an increasingly technological world. By prioritizing empathy and compassion, the healthcare community can create a system that not only cures diseases but also heals individuals, restores dignity, and uplifts the human spirit.

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A Study on the clinically significant Hypoglycaemia among patients with Diabetes Mellitus Type 2 attending the clinics of the Professorial Medical Unit of Colombo South Teaching Hospital Kalubowila

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Abstract

Background: Hypoglycaemia remains а significant concern in the management of Type 2 Diabetes Mellitus (T2DM), particularly among receiving patients insulin or insulin secretagogues. However, research on its prevalence, risk factors, and management is limited in Sri Lanka. This study aimed to evaluate the prevalence, patterns, and risk factors of hypoglycaemia among T2DM patients attending outpatient clinics at Colombo South Teaching Hospital, Kalubowila.

Methods: A cross-sectional study was conducted with 299 randomly selected T2DM patients aged ≥18 years, and having T2DM for ≥1 year. Data were collected via a validated, semi-structured questionnaire. Hypoglycaemic awareness was assessed using the Clarke questionnaire, and statistical analyses were performed to identify associated factors.

Results: The majority of participants were females (58.2%), aged ≥60 years (62.8%), and of Sinhala ethnicity (86.6%). The prevalence of clinically significant hypoglycaemia was 36%. Key risk factors included insulin therapy (p<0.001), gliptin use (p=0.003), and older age. Skipping meals (75.7%) and excessive exercise (50.5%) were the most common triggers while sweating (73.8%) and hunger (51.4%) were frequent symptoms. Most patients (85%) managed hypoglycaemia with sugary foods or drinks. Only 25.2% made lifestyle modifications, and 81.3% received education on hypoglycaemia management. Despite these efforts, impaired hypoglycaemia awareness was identified in 4.7% of participants, increasing their risk of severe events.

Conclusion: Hypoglycaemia is a common and under-recognized complication among T2DM patients in Sri Lanka. While most patients demonstrated adequate awareness and management strategies, a subset remains at high risk due to impaired recognition and insufficient preventive measures. Interventions targeting education, lifestyle modifications, and individualized therapy are essential to minimize adverse outcomes.

Keywords: Type 2 Diabetes Mellitus, Hypoglycaemia, Hypoglycaemic awareness

Introduction

Maintenance of a healthy lifestyle requires the blood glucose level to be maintained in a narrow range. Hypoglycaemia can be considered when the plasma glucose level is less than 72 mg/dl (4 mmol/l) for diabetic patients. Research on Hypoglycaemia among type 1 diabetic mellitus (T1DM) is more common than Type 2. However, the number of patients with type 2 diabetes mellitus (T2DM) is ever-increasing in number. This is especially seen in Asian countries.[1,2]

Risk factors for hypoglycaemia are related to therapeutic hyperinsulinemia or failure of defence mechanisms resulting in a drop in plasma glucose concentration. Any treatment that increases blood insulin levels carries a risk of intermittent hypoglycaemia. Patients treated with insulin or insulin secretagogues (e.g. sulphonylureas and meglitinides) are generally a higher risk. Theoretically, other at hypoglycaemic agents such as DDP-4 inhibitors, metformin and SGLT-2 inhibitors do not cause hypoglycaemia because they are not insulin-secreting agents.[3]

The risk of severe hypoglycaemia is higher in T2DM with a longer duration, lesser insulin reserve and other comorbidities including renal impairment, hypothyroidism and defects of counter-regulator hormone secretion. In type 2 diabetic mellitus patients severe hypoglycaemia increase from 7% to 25% in those who have been taking insulin for more than 5 years.[4] A population-based study done in Scotland by Donnelly et al in 2005 showed the incidence of self-reported severe hypoglycaemia in T2DM treated with insulin is lower than in T1DM treated with insulin. Furthermore, the duration of insulin treatment in T2DM is a key predictor of hypoglycaemia in insulin-treated type 2 patients.[5] Miller et al study on type II diabetic patients in 2001 showed a prevalence of 12% of hypoglycaemic symptoms in patients treated with diet alone. This value was 16% for using oral agents singularly and 30% when treated with any insulin (P<.001). Severe hypoglycaemia was encountered in 0.5% of all using insulin. The study also showed an independent association of insulin therapy, lower HbA1c level at followup, younger age and reports of hypoglycaemia at the baseline visit with increased prevalence of hypoglycaemia.[6]

A cross-sectional study done in Saudi Arabia in 2022 by Al-Qassi by a questionnaire via an online platform showed patients with T2DM in the region of Al-Qassim, have insufficient knowledge about hypoglycaemic complicating type 2 diabetic mellitus and they have concluded that the need for interventional programs to raise public awareness.[7] In 2018, a cross-sectional analysis in the USA found that the mortality and morbidity increase in type 2 diabetic mellites patients due to glucose-lowering drugs that affect the quality of life, high cost and diminished productivity.[8]

A study done by Dissanayaka et al has found that the most common cause of hypoglycaemia is sudden changing diet, while unaccustomed exercise and non-prescribed native food were the other leading causes.[9] Samya et al in India in 2019 demonstrated a high prevalence of self-reported hypoglycaemia in rural settings. This was in to context of poor resources to monitor glucose levels. The study beckons physicians to probe into hypoglycaemic symptoms in all diabetic patients at each visit. The author also elaborates that it is important to educate patients about the symptoms of hypoglycaemia and the importance of reporting such symptoms, which will help in adjusting the dose and preventing future attacks.[10]

There are many studies done in the world regarding hypoglycaemia in T2DM, but in Sri Lanka, very few studies have been published so far. This study is conducted to find the prevalence and pattern of hypoglycaemia among patients with T2DM, which identifies risk factors, severity and management of Hypoglycaemia.

Methodology

The study was done to determine the prevalence and pattern of hypoglycaemia among patients with T2DM attending the clinics of the Professorial Medical Unit of Colombo South Teaching Hospital, Kalubowila. Two hundred ninety-nine (299) adults with T2DM attending outpatient medical clinics were recruited using the random sampling method. Patients aged 18 years and over and having T2DM for more than 1 year duration were recruited. Those with T1DM and having psychiatric and cognitive diseases as well as acute severe illnesses were excluded. A data collection sheet *cum* interviewer-administered, semi-structured pre-validated questionnaire with both closed-ended and open-ended questions was used to collect the data on the current topic and those influencing or confounding. The hypoglycaemic awareness was assessed using the Clarke questionnaire which comprised 8 questions where each response corresponds to "aware" (value 0) or "unaware" (value 1) and the scores were then summed. Scores of 0-2 are categorized as "aware", 4-7 as "unaware", and 3 as "indeterminant".

Results

The demographic profile of the participants is depicted in Table 1. The majority of them were in the seventh decade of their lives and were females of Sinhala ethnicity. The largest group, comprising 92 participants (30.8%), had T2DM for less than 5 years followed by 29.1% having it for 6-10 years. The most prevalent comorbidity was hypertension (79.9%), and dyslipidaemia was the second (27.1%). Less common comorbidities include hyperthyroidism and chronic liver disease. (Table 1)

Metformin was the most widely used oral hypoglycaemic agent (74.2%) followed by

sulphonylureas (59.9%). Gliptins were used by one-quarter of the participants while gliflozins were taken by 6.4%. Acarbose was not used by any participants. Premixed insulin was used by 13.7% of the sample. Among the non-oral hypoglycaemic agents that are associated with a risk of hypoglycaemia aspirin was the most commonly reported 52.2%. Other such agents included fibrates, warfarin, beta-blockers and sulphonamides. (Table 1)

Factors	Frequency (%) (n=299)	
Age (Years)		
< 50	30 (10.0)	
51-60	81 (27.1)	
61-70	103 (34.4)	
71-80	75 (25.1)	
>80	10 (3.3)	
Ethnicity		
Sinhala	259 (86.6)	
Tamil	22 (7.4)	
Muslim	18 (6.0)	
Sex		
Male	125 (41.8%)	
Female	174 (58.2%)	
Educational Level		
Up to primary level education	31 (10.4%)	
Up to Grade 8	81 (27.1%)	
Up to G.C.E. Ordinary Level	161 (53.8%)	
Up to G.C.E. Advanced Level	6 (2.0%)	
Vocational and Higher Education	7 (2.3%)	
Occupational status		
Professionals	54 (18.1)	
Skilled workers	52 (17.4)	
Manual labourers	75 (25.1)	
Housewives	89 (29.8)	
Retired	29 (9.7)	
Monthly Income in LKR		
<25,000	160 (53.5)	
25,000-50,000	94 (31.4)	
50,000-100,000	33 (11.0)	
>100,000	12 (4.0)	
Duration of Diabetes mellitus type 2		
<5	92 (30.8)	
6-10	87 (29.1)	
11-15	51 (17.1)	
16-20	36 (12.0)	
>20	33 (11.0)	
Comorbidities		
Hypertension	239 (79.9)	
Heart failure	77 (25.8)	
Chronic Kidney Disease	21 (7.0)	
Hyperthyroidism	7 (2.3)	

Table 1. Demographics of the study participants

Dyslipidaemia	218 (72.9)
Stroke	42 (14.0)
Chronic liver disease	8 (2.7)
Oral Hypoglycaemic Agents	
Metformin	222 (74.2)
Sulphonylureas	179 (59.9)
Gliptin	74 (24.7)
Gliflozin	19 (6.4)
Acarbose	-
Premixed insulin	41 (13.7)
Non-oral hypoglycaemic Agents with	
hypoglycaemic properties	
Aspirin	156 (52.2)
Fibrates	243 (81.3)
Warfarin	2 (0.7)
Sulphonamides	9 (3.0)
Allopurinol	3 (1.0)
Beta Blocker	94 (31.4)

The most common Clarke score for hypoglycaemic awareness was 0, reported by 41.1% followed by scores 1 (26.2%) and 2 (17.8%) in the aware category. The indeterminant category (score 3) was less common (12.1%). Those in the unaware category (>4) were rare with only 2 participants (1.9%) scoring 4 and 1 participant (0.9%) Among those who had scoring 5. hypoglycaemia with regards to symptoms with low blood sugar, 5 participants (23.4%) indicated that they no longer experience these symptoms, while 82 participants (76.6%) continue to experience them. In this same group a majority of 75 participants (70.1%), experiencing reported never moderate hypoglycaemic events during the last 6 months. participants In contrast. 25 (23.4%)experienced such events once or twice, while 5 participants (4.7%) reported having them once month. Only 2 participants (1.9%) а

experienced moderate hypoglycaemic events every other month in the last 6 months. A majority of 95 participants (88.8%), reported experiencina no severe hypoglycaemic episodes during this period. In a smaller group, 8 participants (7.5%), had one severe episode, while 2 participants (1.9%) experienced three episodes. Additionally, 1 participant (0.9%) reported having either two or five severe episodes. A majority of 72.0%, reported that they can always tell when their blood sugar is low. A smaller group of 13.1%, noticed low blood sugar often while 8.4% of participants sometimes recognized it. A proportion of 4.7% never experienced this awareness. This indicates that while many patients are attuned to their hypoglycaemic symptoms, a notable minority struggle with recognition, which may increase their risk of severe hypoglycaemia. (Table 2)

Clarke score parameters (R – reduced, A – aware)	Frequency (%)
1) Frequency of appearance of symptoms (A)	
Always have symptoms when their blood sugar is low (R)	73 (68.2)
Sometimes have symptoms when their blood sugar is low (R)	30 (28.0)
No longer have symptoms their blood sugar is low	4 (3.7)

Table 2. Clarke Score on Hypoglycaemic A	wareness among those who	had hypoglycaemia
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 Hypoglycemic symptoms persist when their blood sugar is low. 	
ʻ=Yes (R)	25 (23.4)
No (A)	82 (76.6)
 3) Moderate hypoglycemic events episodes in the past six months (where one might feel confused, disoriented, or lethargic and were unable to treat himself) 	
Never (A)	75 (70.1)
Once or twice (R)	25 (23.4)
Every other month (R)	2 (1.9)
Once a month (R)	5 (4.7)
More than once a month (R)	-
 Severe hypoglycemic episodes in the past year (episodes where one was unconscious/had a seizure and needed glucagon/ intravenous glucose) 	
0 (A)	95 (88.8)
1 (R)	8 (7.5)
2 (R)	1 (0.9)
3 (R)	2 (1.9)
5 (R)	1 (0.9)
 Hypoglycemic event (<70 mg/dl) frequency with symptoms in the last month 	
Never	72 (67.3)
1-3 times	28 (26.2)
1 per week	4 (3.7)
2-3 per week	2 (1.9)
>4-5 per week	1 (0.9)
 Hypoglycemic event (<70 mg/dl) frequency without symptoms in the last month 	
Never	99 (92.5)
1-3 times	8 (7.5)
1 per week	0(0.0)
2-3 per week	0(0.0)
>4-5 per week	0(0.0)

(<i>R</i>) = answer to Q5 is less than the answer to Q6 (<i>A</i>) = answer to Q5 is greater than or equal to the answer to Q6		
7) Blood sugar level at which hypoglycaemia is felt	Frequency (%)	
60 - 70 mg/dl	29 (27.1)	
50 - 59 mg/dl	4 (3.7)	
40 - 49 mg/dl	3 (2.8)	
<40 (R)	3 (2.8)	
Not sure (R)	68 (63.6)	
8) The extent that one can tell by symptoms that the blood sugar is low		
Never (R)	5 (4.7)	
Rarely (R)	2 (1.9)	
Sometimes (R)	9 (8.4)	
Often (A)	14 (13.1)	
Always (A)	77 (72.0)	
Total Clark survey score (Cumulative of R scores)	Frequency (%)	
0	44 (41.1)	
1	28 (26.2)	
2	19 (17.8)	
3	13 (12.1)	
4	2 (1.9)	

Meal skipping was the most significant trigger for hypoglycaemic episodes among them followed by excessive physical activity and dosage errors. Sweating was the most common autonomic symptom (73.8%). Other autonomic symptoms included hunger (51.4%), tremors (45.8%), palpitations (26.2%) and anxiety (14.0%). Focal deficits such as an arm or leg weakness were noted as a neuroglycopenic symptom in 35.5%. Other such symptoms were confusion (29.9%), slurred speech (24.3%), loss of consciousness (10.3%) and seizures

being the least common (2.8%). With regards to the perception of the episodes using a Likert scale, mild levels were reported in the majority (38.3%) while severe ones were seen in 2.8%. A majority of 68.2% consistently experienced symptoms whenever their blood sugar levels dropped. In contrast, 28% reported experiencing symptoms only occasionally, indicating variability in their responses to hypoglycaemia. Notably, 3.7% indicated that they no longer experience symptoms associated with hypoglycaemia (Table 3).

1 (0.9)

5

Table 3. Triggers and Symptoms of Hypoglycaemia

Specific triggers	Frequency (%) (n=107)
Skipping meals	81 (75.7)
Excessive exercise	54 (50.5)
Erratic medication timing	6 (5.6)
Errors in drug dosage	23 (21.5)
Acute illness	10 (9.3)
Alcohol excess	1 (0.9)
Autonomic Symptoms	
Palpitation	28 (26.2)
Sweating	79 (73.8)
Anxiety	15 (14.0)
Tremors	49 (45.8)
Hunger	55 (51.4)
Neuroglycopaenic Symptoms	
Confusion	32 (29.9)
Seizure	3 (2.8)
Loss of consciousness	11 (10.3)
Slurred speech	26 (24.3)
Focal defects	38 (35.5)
Severity of hypoglycaemia perceived (Likert scale)	
1 (Mild)	41 (38.3)
2	30 (28.0)
3	25 (23.4)
4	8 (7.5)
5 (Severe)	3 (2.8)
Development of symptoms when biochemical	
Always have symptoms	73 (68.2)
Sometimes have symptoms	30 (28.0)
No longer have symptoms	4 (3.7)

The most common approach to manage hypoglycaemia used was intake of sugar, sugary drinks, or sweets (85%). Additionally, 54.2% chose to ingest a meal to address low blood sugar. When seeking external help 36% would call for assistance, while a smaller number of 7.5% would seek help from their primary care provider. Hospitalization was a

rare measure, with only 6 participants (5.6%) opting for this route. Methods such as omitting, postponing, or reducing the next dose of therapy are infrequently used. This data highlights the reliance on immediate dietary interventions for managing hypoglycaemic episodes among patients. (Table 4)

	Frequency (%) (n=107)
Intake of sugar/ sugar drinks/ sweets	91(85.0)
Ingestion of a meal	58 (54.2)
Omit the next dose of therapy	6 (5.6)
Postpone the next dose of therapy	0 (0.0)
Reduce the next dose of therapy	2 (1.9)
Call help	36 (33.6)
Seek primary care practitioners to help	8 (7.5)
hospitalization	6 (5.6)

Table 4. Methods of management of hypoglycaemia

The impact and experience of hypoglycaemia on daily life are depicted in Table 5. It reflects that while many patients are attuned to their hypoglycemic symptoms, a notable minority struggle with recognition, which may increase their risk of severe hypoglycemia.

Table 5: Impact and experience of hypoglycaemia in daily life

	Frequency (%) (n=107)
1-2 hours rest	1 (0.3)
Affected only during the attack.	1 (0.3)
Climbing stairs with caution as she becomes dizzy, which becomes better upon ambarella juice.	1 (0.3)
Day-to-day activities including housework and work related to occupation	1 (0.3)
Difficult to do regular housework.	4 (1.2)

Difficult to do work due to vision change.	1 (0.3)
Eats on time.	7 (2.3)
Hard to do physical work and gets angry easily.	1 (0.3)
Inability to do the job	1 (0.3)
Manages day-to-day life but finds it hard to do housework without eating.	1 (0.3)
Needs to eat on time.	1 (0.3)
Needs to eat on time or gets symptoms.	1 (0.3)
No impact	32 (10.7)
Not able to do regular work in the morning if I get hypoglycemia at night.	1 (0.3)
Not really, he can push through. Tight control on diet and lifestyle.	1 (0.3)
Not really when meal-delayed symptoms appear and then eat sweets it goes away.	1 (0.3)
Reduce daily work	11 (3.7)
Resting after working for 30 min and taking glucose.	1 (0.3)
Scared to do heavy work	1 (0.3)
She cannot do her housework	1 (0.3)
She pushes through the symptoms as she has to do housework by herself.	1 (0.3)
Sleeping 10-15 min in day time	1 (0.3)
Tries to eat on time despite heavy workload	1 (0.3)
Unable to do work at a stretch	1 (0.3)
Unable to do normal work for 1 hour.	1 (0.3)

A predominant proportion expressed high confidence in their abilities or understanding of the subject. A proportion of 69.2% reported being "very confident," indicating a strong sense of assurance. In contrast, only 4.7% of participants identified as "not confident". (Table 6)

Table 6. Level of Confidence in Managing Hypoglycaemia

	Frequency (%) (n=107)
1 (Not confident)	5 (4.7)
2	3 (2.8)

3	6 (5.6)
4	2 (1.9)
5	1 (0.9)
6	2 (1.9)
7	1 (0.9)
8	10 (9.3)
9	3 (2.8)
10 (Very confident)	74 (69.2)

Participants' concerns about hypoglycemic symptoms were assessed using a Likert scale where 0 being not concerned and 10 being extremely concerned. Less than 1/5th expressed none, while a significant portion, (40.2%), reported extreme concern. (Table 7)

There was no significant difference in hypoglycaemia awareness between these age groups, gender, duration or associated comorbidities. (Table 8)

	Frequency (%) (n=107)
0 (Not concerned)	20 (18.7)
2	9 (8.4)
3	12 (11.2)
4	2 (1.9)
5	4 (3.7)
6	2 (1.9)
7	5 (4.7)
8	6 (5.6)
9	4 (3.7)
10 (Extremely concerned)	43 (40.2)

Table 7. Participants' concerns about hypoglycemic symptoms

Factors	Awareness of hypoglycemia		P value
	Normal awareness (N=91)	Borderline and impaired awareness (N=16)	
Age (Years)		
<60	38 (86.4)	6 (13.6)	χ2=0.10 df=1 P=0.750
>60	53 (84.1)	10 (15.9)	
Gender			
Male	32 (88.9)	4 (11.1)	χ2=0.63 df=1 P=0.427
Female	59 (83.1)	12 (16.9)	
Duration of	diabetes mellitus type 2		
< 5 years	20 (83.3)	4 (16.7)	χ2=0.071 df=1 P=0.753*
> 5 years	71 (85.5)	12 (14.5)	
Comorbidit	ies		
Hyperten sion	78 (86.7)	12 (13.3)	χ2=1.16 df=1 P=0.279*
Heart failure	26 (76.5)	8 (23.5)	χ2=2.88 df=1 P=0.090
CKD	10 (76.9)	3 (23.1)	χ2=0768 df=1 P=0.408*
Hyperthy roidism	3 (100.0)	0 (0.0)	χ2=0.54 df=1 P=1.000*
Dyslipide mia	67 (88.2)	9 (11.8)	χ2=1.99 df=1 P=0.158

Table 8. Association between awareness of hypoglycaemia

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Stroke	14 (93.3)	1 (6.7)	χ2=0.94 df=1 P=0.461*
Chronic liver disease	4 (80.0)	1 (20.0)	χ2=0.10 df=1 P=0.563*

The data revealed significant associations between several medications and hypoglycemia. Metformin was associated with a higher incidence of hypoglycaemic episodes (p=0.020) while gliptins also showed a similar pattern (p=0.003). In contrast, sulphonylureas and gliflozins did not show significant associations with hypoglycaemia. Notably, premixed insulin was strongly linked to hypoglycaemic episodes (p<0.001). This suggests that patients using premixed insulin are at a significantly higher risk of experiencing hypoglycaemic episodes compared to those not using it. (Table 9)

Medication	Number of patients with hypoglycaemic episodes (n=107)		P Value
	Yes	No	
Metformin	71 (32.0)	151 (68.0)	χ2=5.42 df=1 P=.020
Sulphonylureas	62 (34.6)	117 (65.4)	χ2=0.25 df=1 P=.613
Gliptin	37 (50.0)	37 (50.0)	χ2=8.64 df=1 P=.003
Gliflozin	7 (36.8)	12 (63.2)	χ2=0.01 df=1 P=.921
Premixed insulin	30 (73.2)	11 (26.8)	χ2=28.9 df=1 P<0.001
Beta-blockers	27 (87.1)	4 (12.9)	χ2=0.14 df=1Ρ=1.000*

 Table 9: Association between hypoglycaemic episodes and medication

Discussion

Disabling and life-threatening micro and macrovascular complications of T2DM highlight the need for optimum management.[2] The benefits of intensive glycaemic control in the prevention of these complications are well recognized.[11] However, it has been observed that most patients do not reach the optimum level of glycaemic control despite well-defined management protocols.[11] This, at least partly. is attributable to the fear of hypoglycaemia, both among patients and treating medical professionals.[12] In fact, in the ACCORD study, the higher mortality rate in the intervention arm is largely attributable to a higher incidence of hypoglycaemic events due to the rapid reduction of blood glucose.[13] Unpleasant symptoms of hypoglycaemia reduce patients' compliance with and confidence in treatment and discourage

medical professionals from adopting aggressive treatment strategies.[12] Insulin and oral antihyperglycemic agents, particularly those that increase insulin secretion independent of plasma glucose levels are the major causes for iatrogenic hypoglycaemia.

The female predominance in our study, despite the finding that male patients had a significantly higher incidence of hypoglycaemia, may suggest that gender-specific factors influence the risk of hypoglycaemia.[13] While males seem more prone to hypoglycaemia even with lower insulin doses, the overall higher number of female participants could indicate that the higher hypoglycaemic risk in males may be more pronounced in smaller male subgroups. This implies that while male patients require careful monitoring for hypoglycaemia, the study's female-dominant sample may reflect the general population's demographic distribution of healthcare access patterns. However, some studies suggest that women may experience more severe or symptomatic episodes, although this was not observed in our cohort. Further investigation is needed to explore potential subtle differences in hypoglycaemia experiences between genders.

Recent studies indicate that the prevalence of T2DM increases with age, which aligns with the findings of our study, where the majority of participants are aged 50 years and older.[14] This highlights the higher risk of T2DM in older populations.

Previous studies observed that occupation, knowledge, and education were characteristic factors of the occurrence of hypoglycaemia.[15] In our study, the majority of participants had a relatively low education level, with most completing up to O/L and many only reaching Grade 8. Many were housewives and manual labourers, reflecting lower-income occupations, with over half earning less than twenty-five thousand rupees monthly. This lower education and income likely contribute to their limited knowledge of hypoglycaemia, despite many having experienced it. These findings highlight the need for better education on hypoglycaemia management, particularly in lower-income and less-educated populations.

The study found that the prevalence of clinically significant hypoglycaemia among T2DM patients attending the clinics of Colombo South Teaching Hospital Kalubowila was 0.36%. Recent studies showed a hypoglycaemia prevalence of 21.7% among patients with T2DM, where incidents occurred with varying severity. This suggests that hypoglycaemia is a frequent complication in T2DM, especially among patients on insulin or sulfonylurea therapy.[16] In relation, our study found that a 0.3% prevalence of hypoglycaemia with normal awareness was observed in the majority of patients, while only 2.8% experienced impaired awareness of hypoglycaemia (IAH). In our study hypoglycaemia prevalence appears lower, but the presence of impaired awareness, even in a small fraction of patients, is significant. It highlights the risk of undetected hypoglycaemic episodes, which can lead to severe complications. Our findings suggest that, while hypoglycaemia remains a concern, the majority of patients maintain sufficient awareness, though targeted interventions are needed for those with impaired awareness to reduce the risk of severe events.

The results identified several key risk factors for hypoglycaemia, other than older age and other demographic factors, longer duration of diabetes, and the use of insulin was significant. These findings are consistent with the literature, where older adults with longer disease duration are at higher risk due to declining renal function and increased sensitivity to insulin.[17,18] The ACCORD study (2017) also highlighted these risk factors, emphasizing that patients with long-standing particularly T2DM are vulnerable to hypoglycaemic episodes. Our study thus supports the need for tailored therapeutic strategies for older patients with prolonged diabetes duration.

Regarding the role of medication in hypoglycaemia risk patients on insulin and gliptins had a significantly higher incidence of hypoglycaemia compared to those on metformin or other oral antidiabetic agents. This finding corroborates with previous studies, which showed that also insulin and sulfonylureas carry higher а risk of hypoglycaemia compared to other treatment modalities.[19] But in our study sulfonvlurea is not significant. Sulfonylureas may not have been significant in our study due to a smaller sample size. Metformin rarely causes hypoglycaemia, which aligns with our study findings.[20] Beta-blockers did not show any association with hypoglycaemia in our study, which aligns with global research indicating a lack of significant connection between nondiabetic drugs like beta blockers and hypoglycaemia.[21] The results indicate that physicians must exercise caution when prescribing these medications, especially in patients prone to hypoglycaemic episodes, and that combination therapy should be individualized. Non-diabetic drugs are occasionally associated with hypoglycaemia, although the strength of their causal relationship is often debated. In our study, aspirin and fibrates were the most commonly used non-diabetic medications. Despite their

frequent prescription, these drugs are not strongly linked to hypoglycaemia. The reporting of hypoglycaemia in association with these drugs may reflect their common use rather than a direct cause. Research on other medications such as heparin, which has been sporadically linked to hypoglycaemia in critically ill patients, highlights how alternative factors like illness and sepsis might play a more significant role than the medication itself.[22] This suggests that clinicians should consider multiple factors when assessing the potential for hypoglycaemia induced by non-diabetic drugs, especially when other underlying conditions or treatments (such as insulin or sulfonylureas) are present. The evidence supporting a direct these medications link between and hypoglycaemia remains weak and warrants further investigation.

The study also explored the relationship between hypoglycaemia and comorbid conditions, finding that patients with chronic kidnev disease were more prone to hypoglycaemia. Other comorbidities such as hypertension, heart failure, hyperthyroidism, dyslipidaemia, stroke and chronic liver disease do not show significant association. This association has been well-documented, in recent studies with reporting that impaired renal function exacerbates the risk of hypoglycaemia, likely due to altered drug clearance and the heightened impact of blood sugar fluctuations.[23] These findings underscore the need for closer monitoring of atrisk patients and potential adjustments in therapy.

Interestingly, lifestyle factors such as irregular meal patterns and excessive exercise were also associated with an increased risk of hypoglycaemia in this study. Poor dietary habits and alcohol use disrupt glucose metabolism, leading to unpredictable fluctuations in blood sugar levels. Our findings highlight the importance of lifestyle counselling in the management of diabetes, emphasizing regular meal intake and moderation in alcohol consumption to prevent hypoglycaemia.

The pattern of hypoglycaemia in our study reveals diverse frequencies and severities of episodes among participants. A significant portion experienced hypoglycaemic episodes, while the majority did not when the blood sugar level was below 70.2 mg/dl. Among those who reported hypoglycaemia, episodes varied from 1 to 4 per week for a small percentage, indicating a consistent occurrence of mild or moderate hypoglycaemia. However, most participants experienced hypoglycaemia less frequently, with the majority reporting more than weekly episodes and 18.5% experiencing them monthly. This range highlights that while some patients face regular glucose fluctuations, many encounter hypoglycaemia sporadically, which aligns with global data showing variability in frequency based on treatment regimens and patient adherence.

In terms of symptom recognition, the majority could always recognize when their blood sugar was low, which is crucial for preventing severe episodes. This high level of awareness helps to manage mild and moderate symptoms before they escalate. Autonomic symptoms, such as sweating and hunger, were commonly reported, while neuroglycopenic symptoms, such as confusion and slurred speech, were less frequent, typically appearing in more severe cases of hypoglycaemia.

The data from your study shows a clear distribution of hypoglycaemic episodes by severity, with mild episodes being the most commonly reported (38.3%), followed by moderate episodes (28.0%), and severe episodes being the least common (2.8%). These findings align with global trends, where mild hypoglycaemia tends to occur more frequently due to the increased sensitivity of blood glucose monitoring and the widespread use of insulin therapies.[24]

Moderate hypoglycaemia, which requires intervention but is not life-threatening, affected a notable percentage of your participants (23.4% reporting at least one episode in the past six months). This shows that moderate hypoglycaemia is a concern, particularly in patients undergoing intensive glucose control.

Severe hypoglycaemia, characterized by episodes requiring external assistance due to neuroglycopenic symptoms, is reported in a smaller proportion of patients. This lower incidence is consistent with international studies, where severe hypoglycaemia is less common but can result in significant morbidity and hospitalizations, especially among older patients and those on insulin.[24] The severity of hypoglycaemia tends to increase with a more aggressive treatment regimen, which emphasizes the importance of balancing glycaemic control with the risk of hypoglycaemic episodes.

In terms of symptom recognition, the majority (72.0%) could always recognize when their blood sugar was low, which is crucial for preventing severe episodes. This high level of awareness helps to manage mild and moderate symptoms before they escalate. Autonomic symptoms, such as sweating (73.8%) and hunger (51.4%), were commonly reported, while neuroglycopenic symptoms, such as confusion (29.9%) and slurred speech (24.3%), were less frequent, typically appearing in more severe cases of hypoglycaemia.

The study also explored the impact of hypoglycaemia on patients' quality of life. The majority hadn't been impacted. But found that recurrent hypoglycaemia significantly reduced both physical and emotional well-being. Patients reported anxiety, fear of future episodes, and restrictions in daily activities, similar findings in a recent study, which highlighted the psychological burden of hypoglycaemia.[25] Our results reinforce the importance of not only addressing the physical management of hypoglycaemia but also offering psychological support and counselling for affected individuals.

Regarding the awareness of hypoglycaemia, the majority had a good awareness. A subset of patients in our study exhibited hypoglycaemia unawareness, where they failed to recognize the early symptoms of low blood sugar. Repeated hypoglycaemic episodes blunt the body's response to low glucose levels. This poses a significant risk for severe hypoglycaemia and calls for strategies such as adjusting treatment targets and using CGM to better manage these patients. Awareness is not associated with age, gender demographic factors and duration of the DM.

The management of hypoglycaemia among patients in this study primarily involves immediate intake of sugar, sugary drinks, or sweets, as reported by the majority of participants. This is consistent with standard recommendations for quick hypoglycaemia which emphasize management, rapid carbohydrate ingestion to restore blood glucose levels. Additionally, nearly half of the participants chose to manage their symptoms by ingesting a meal, which can help maintain stable blood sugar levels post-episode. External support was sought by 33.6% of participants, reflecting a reliance on assistance during more severe or prolonged episodes. Seeking medical help from a general practitioner or hospitalization was rare, suggesting that most patients manage mild or moderate hypoglycaemia independently. The infrequent use of methods such as adjusting the next dose of therapy highlights that proactive insulin or medication modification is not commonly adopted by these patients. This aligns with global findings that emphasize immediate symptom management over treatment adjustment in acute hypoglycaemic events.

The prevention of hypoglycaemia among participants in this study showed that only a small proportion made modifications to their daily routines to manage their condition. Strategies included adjusting insulin doses, adhering to timely meals, modifying meal plans, and reducing daily work intensity. These personal interventions align with global recommendations, which emphasize regular monitoring of blood glucose levels, proper timing of meals, and medication adjustments to prevent hypoglycaemic episodes.[26] However, the fact that 74.8% of participants did not implement preventive changes indicates a significant gap in proactive management.

This gap might be partially explained by the lack of education or guidance. While a significant majority of participants had received education on managing and preventing hypoglycaemia, a smaller percentage had not. Education plays a critical role in empowering patients to make necessary lifestyle adjustments and engage in effective self-care. Studies have consistently shown that patients who receive proper guidance on hypoglycaemia management are better equipped to prevent severe episodes. The data suggests that while most participants were educated, there remains room for improvement, particularly in translating education into practical, everyday strategies to prevent hypoglycaemia.

Limitations

There are a few limitations in our study. The sample size, while adequate for identifying trends, may not fully capture the entire population of T2DM patients in Sri Lanka. Additionally, our reliance on patient selfreporting for some data points, such as hypoglycaemia symptoms and lifestyle factors, introduces the potential for recall bias. Additionally, the study only assessed a limited number of non-diabetic drugs, leaving other potentially hypoglycaemia-inducing medications unexplored. Lastly, the crosssectional nature of the study limits the ability to relationships establish causal between variables.

Recommendations

The study on clinically significant hypoglycaemia among T2DM patients suggests several key recommendations. To improve management, there should be enhanced patient education focusing on hypoglycaemia awareness. glucose monitoring, and medication safety. Regular glucose monitoring and optimized clinic practices are advised to ensure consistent care. A multidisciplinary approach, integrating endocrinologists, dietitians, and diabetes educators, could offer a comprehensive management strategy. Longitudinal studies are recommended to assess long-term intervention effects. Developing patient support systems and proposing policy changes to healthcare facilities could further improve care and resource allocation. These recommendations aim to better manage and prevent hypoglycaemic events in T2DM patients.

Conclusion

This study aimed to determine the prevalence and patterns of hypoglycaemia

among T2DM patients at Colombo South Teaching Hospital, Kalubowila. It found a low prevalence of hypoglycaemic episodes, with the majority having mild to moderate episodes. Key risk factors included insulin therapy, gender, age, educational level and occupation. Most patients managed their hypoglycaemia with sugar intake, while fewer made lifestyle changes or sought medical help. The findings highlight the importance of regular monitoring and personalized management to improve patient outcomes and reduce hypoglycaemic risks

Ethics approval and consent to participate: Consent and Ethics approval from the research committee of the Colombo South Teaching Hospital. Our study did not include any interventions on participants.

Availability of data and material: The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

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Authors' contributions:

GSH, SHS and SFHDS contributed to the literature search, acquisition of data, analysis of data, interpretation of data, and drafting of manuscript. The conceptualisation of the study was done by SFHDS who was the overall supervisor

List of Abbreviations:

T1DM – Type 1 Diabetes Mellitus

T2DM – Type 2 Diabetes Mellitus

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Knowledge and Associated Factors of Knowledge on Autism Spectrum Disorder Among Preschool Educators in Colombo, Sri Lanka

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Abstract

Background: Autism spectrum disorder (ASD) are increasingly prevalent condition in the modern world in which early diagnosis and commencement of therapy are shown to be effective in the management of symptoms. Preschool teachers can play an important role in the identification of children affected by ASD as symptoms start around the age of 3.

Objective: To describe the knowledge, sources of information and associated factors of knowledge on Autism Spectrum Disorder among preschool teachers in the Colombo District.

Methods: A cross-sectional descriptive study was conducted to determine the knowledge level of 211 preschool teachers, who were selected using cluster sampling, in the Colombo District, Sri Lanka. A self-administered questionnaire was distributed via a Google form. Data was analysed using SPSS software version 26.0. The significant level was set at 5%.

Results: 114 (54%) teachers had a good level of overall knowledge of ASD. The factors: Diplomas, seminars, books, workshops and training programs on ASD and other developmental disorders had shown a statistically significant association with adequate knowledge (p<0.05).

Conclusion: Based on the findings, it can be concluded that a significant proportion of good teachers demonstrate а overall knowledge of Autism Spectrum Disorder underscore (ASD). These results the importance continuous professional of development targeted educational and interventions for teachers to enhance their understanding and support for students with ASD in educational settings.

Introduction

Autism Spectrum Disorders (ASD) are a group of neurodevelopmental characterized by a certain degree of impaired social behaviour and language and communication skills. According to the World Health Organization (WHO), the current rate of ASD in the world is about 1 in 160. A study done by Perera et al. 2009, has found that 1 in 93 children with a prevalence of 1.07% are affected with ASD in Sri Lanka between 18 and 24 months. While the cause of ASD is not properly understood, risk factors include genetics, environmental factors like nutrition, pollution and toxins, and the male gender. Past study results have proved that there is a significant hereditary influence regarding cognitive functional defects including Autism (Folstein and Rutter 1977). Obstetric and perinatal hazards also contribute to the development of ASD, but those events are not independent and they are always associated with underlying abnormal genetic development (Bailey A et al. 1995). ASDs affect males more than females, as several sex chromosomal genes and hormonal factors may be contributing factors. Especially the testosterone hormone may cause the occurrence of the autistic phenotype. (Donna and Daniel 2013).

ASD symptoms typically appear by age two or three, worsening without proper management. Key signs include lack of eye contact, unusual speech patterns, language delays, and repetitive behaviours like stacking objects.

Contrary to myths, ASD isn't a learning disability; many individuals have aboveaverage intelligence quotient (IQ) and excel in various subjects. Misconceptions about its causes, such as bad parenting or vaccines, have been debunked by research, showing no link between vaccinations like measles, mumps, and rubella vaccine and autism. (Taylor B et al. 2002).

The prognosis for children with ASD varies based on IQ level. Those with lower IQs may struggle to live independently, while higherfunctioning individuals may achieve independence. However, even with improvement, ASD doesn't mean complete mental health or social adaptation due to potential neuropsychiatric comorbidities postrecovery. (Helt M et al. 2008).

The onset of this developmental disability may persist since infancy (Peter Szatmari 2003) Usually, it is a lifelong disorder. While as of today there is not a definitive cure for ASD and the condition is a lifelong burden, early detection and management play a major role in creating a good quality of life for these children. Diagnosis is based on the history and analysis of behaviour. It can be done using screening methods, such as the Modified Checklist for Autism in Toddlers (MCHAT), (Baron, Allen and Gillberg 1992). Special education programs and behavioural and communication therapy have been shown to help children acquire communication and social skills and reduce the severity of symptoms. It will reduce the longterm issues, prevent worsening the symptoms and provide much time for the improvement of the well-being of the children. (Jennifer Harrison Elder et al. 2017).

Methodology

A descriptive cross-sectional study was conducted to determine the knowledge on Autism Spectrum Disorder (ASD) among preschool teachers, the sources of knowledge and the factors associated with knowledge on ASD among preschool teachers.

This study was conducted among preschool teachers in selected pre-schools in Colombo District.

Inclusion Criteria

Pre-school teachers in the Colombo District who are fluent in either Sinhala or English.

Exclusion Criteria

Pre-school teachers who do not have access to internet facilities.

Sample size - 239

Sampling Technique:

Ethical clearance for the study was obtained from the ethics review committee of the Faculty

of Medical Sciences, University of Sri Jayewardenepura. Further, administrative clearance was secured by the principals and/or Persons in charge of each pre-school.

A list of all the preschools (1013 in number) in the Colombo district was obtained and 55 preschools were selected from this list by simple random sampling using computergenerated random numbers. Then from each preschool, a maximum of 5 teachers were randomly selected for the study (overall the sampling technique was cluster sampling.) 240 preschool teachers were contacted and asked to take part in the study. Of these 240 teachers, 29 were excluded from the study according to the exclusion criteria and inappropriate responses. Data from 211 teachers were taken for the study.

Data from the questionnaire was entered into a single database and analysed, using SPSS software. Range checks and customs checks were performed to ensure the accuracy of data. Univariate and multivariate tables have been presented with appropriate statistical tests.

The knowledge was assessed under 3 sections: Knowledge regarding Risk Factors, Knowledge regarding Signs, Symptoms, and Identification of ASD and overall knowledge. The knowledge levels were determined as follows.

For Knowledge regarding Risk Factors, a score of 3 or higher out of 5 was considered as a good knowledge level.

Knowledge regarding Signs, Symptoms, and Identification of ASD, a score of 15 or higher out of 22 was considered as a good knowledge level.

Overall knowledge was taken as the sum of these two components of knowledge. An overall knowledge of 18 or higher out of 27 was considered a good knowledge level.

The association of each variable with the knowledge regarding risk factors of ASD, with the knowledge regarding the signs, symptoms, and features of ASD and with the overall knowledge regarding ASD were assessed using a chi-squared test for categorical variables and t-test for numerical variables.

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Characteristic	Responses	Number (n = 211)	Percentage
	20-29	57	27.0%
	30-39	63	29.9%
Age group	40-49	65	30.8%
	50-59	21	10.0%
	Over 60	5	2.4%
	Muslim	27	12.8%
Race	Sinhalese	187	85.8%
	Tamil	3	1.4%
	Buddhist	148	70.1%
Religion	Catholic/Ch ristian	35	16.6%
	Hindu	1	0.5%
	Islam	27	12.8%
	Divorced	4	1.9%
	Married	168	79.6%
Marital status	Unmarried	36	17.1%
	Widowed	3	1.4%
	0	71	33.6%
Number of	1	53	25.1%
children (if any)	2 to 3	86	40.8%
	More than 3	1	0.5%
	A/L	12	5.7%
	Diploma	144	68.2%
	O/L	7	3.3%
Highest achieved	Other	4	1.9%
Educational Level	Postgradua te	12	5.7%
	Undergradu ate	32	15.2%
Are you following / completed a	No	128	60.7%
degree in elementary education?	Yes	83	39.3%

Table 1: Total Frequency distribution of the sociodemographic factors of the study population.

	Less than 5	45	21.3%	
Number of years	years	10	,0	
of Experience as	5 to 10	66	21 20/	
a preschool	years	00	31.3%	
teacher	More than	100	17 10/	
	10 years	100	47.470	
	Less than	24	11 /0/	
How many	10	24	11.4 /0	
students are	10 to 30	153	72.5%	
class?	More than 30	34	16.1%	

Results

Sociodemographic and teaching experiencerelated factors of the study population.

Considering the age groups of the participants, the majority (30.8%) of the preschool teachers were in the "40 - 49" years category, 187 (85.8%.) teachers were Sinhalese and 148 (70.1%) were Buddhists, 168 (79.6%) were married, 140 (66.4 %) had children.

The highest achieved educational level of most of the teachers was a diploma (68.2%). Out of the study sample, only 39.3% of the teachers

stated that they are following or completed a degree in elementary education. The majority of the teachers (52.6%) had less than 10 years of experience as a preschool teacher. The majority of the teachers (72.5%) stated that there are 10–30 students in their class.

We decided to disregard gender as a variable as out of 211 participants, 209 (99.05%) of them were female, 1 (0.47%) was male and 1 (0.47%) preferred not to state the gender. Since the counts of the "Male" and "Prefer not to say" are negligible compared to the count for "Female", this variable was removed from the study.

		Number		
Characteristic	Responses		Percentage	
		(n = 211)		
	Good Knowledge level			
	(more than 18 out of	114	54.0%	
Total Score Groups	27)			
	Poor Knowledge level	07	46.00/	
	(18 or less out of 27)	97	40.0%	
	Good Knowledge level	07	46.0%	
Knowledge of Risk Factors	(more than 2 out of 5)	51	40.0%	
of ASD Score Groups	Poor Knowledge level	111	F4 00/	
	(2 or less out of 5)	114	54.0%	
Knowledge of Signs,	Good Knowledge level			
Symptoms, and	(more than 14 out of	176	83.4%	
Identification of ASD	22)			

Score Groups	Poor Knowledge level	25	16 60/	
	(14 or less out of 22)	30	10.0%	

Knowledge

Ninety seven (46%) teachers had good knowledge regarding risk factors of ASD and 176 (83.4%) had a good knowledge level

regarding the signs, symptoms, and identification features of ASD.

Therefore 114 (54%) teachers had a good level of overall knowledge on ASD.

Table 3: Frequency	distribution	of sources	of information	regarding ASD.

Characteristic	Bosponsos	Number	Porcontago	
Characteristic	Responses	(n = 211)	Percentage	
Diploma/course that	No	127	60.2%	
includes developmental disorders as a component	Yes	84	39.8%	
Cominer en ACDe	No	104	49.3%	
Seminar on ASDS	Yes	107	50.7%	
	Electronic media	143	67.8%	
	Books	106	50.2%	
	Workshops and			
Individual Sources of	Training	103	48.8%	
Knowledge	Programs			
Knowledge	Other People	117	55.5%	
	N.B. Each participant was able to select more			
	than one source of knowledge, therefore the			
	total percentages of each index of knowledge			
	will exceed 100%			

Sources of information

Regarding sources of knowledge that preschool teachers have obtained their knowledge on ASD, most teachers are neither following nor have followed a diploma/course that includes developmental disorders as a component. However, 107 of the teachers (50.7%) of the study population have attended at least one seminar on ASD.

Regarding the individual sources of knowledge that they have gained their knowledge on ASD, electronic media is the source of knowledge for the majority for 67.8%) of teachers in this study population. While 50.2% (106) of the population gained their knowledge from books, 48.8% from workshops and training programs and 55.5% (117) from other people.

	Association between a Diploma and overall knowledge.				
	Good Knowledge n (%)	Poor Knowledge n (%)	Total n (%)	Significance	
Yes	57 (67.9)	27 (32.1)	84 (100)	X ² =10.745	
No	57 (44.9)	70 (55.1)	127 (100)	df = 1	
Total	114 (54.0)	97 (46.0)	211 (100)	p = 0.001	
Association between a Seminar and overall knowledge.					
Yes	70 (65.4)	37 (34.6)	107 (100)	X ² = 11.343	
No	44 (42.3)	60 (57.7)	104 (100.0)	df = 1	
Total	114 (54.0)	97 (46.0)	211 (100.0)	p = 0.001	
	Association betw	ween books an	d overall knowle	edge.	
Yes	69 (65.1)	37 (34.9)	106 (100)	X ² = 10.502	
No	45 (42.9)	60 (57.1)	105 (100)	df = 1	
Total	114 (54.0)	97 (46.0)	211 (100)	p = 0.001	
Association between workshops and training programs and overall knowledge.					
Yes	63 (61.2)	40 (38.8)	103 (100)	X ² = 4.126	
No	51 (47.2)	57 (52.8)	108 (100)	df = 1	
Total	114 (54.0)	97 (46.0)	211 (100)	p = 0.042	

Table 4: Association between source	s of information and overall knowledge.
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Factors associated with the knowledge of ASD.

Teachers who have followed or are following a diploma that includes developmental disorders have a good knowledge level (67.9%) compared to the teachers who have not followed or are not following a diploma. There was a significant association (p = 0.001) between following or following such a diploma and the overall knowledge regarding ASD.

In addition, more teachers who have attended a seminar on ASD had a good knowledge level (65.4%) compared to teachers who have not attended any seminar on ASD. There was a statistically significant association (p = 0.001) between having attended a seminar on ASD and overall Knowledge.

Considering overall knowledge of ASD, more teachers who have gained knowledge from books had a good knowledge level (65.1%) compared to teachers who have not used books. There was a statistically significant

association (p = 0.001) between being informed of ASD through books and overall knowledge of ASD.

In addition, more teachers who have gained knowledge from workshops and training programs had a good knowledge level (61.2%) compared to teachers who have not attended workshops and training programs. There was a statistically significant association (p = 0.042) between being informed of ASD through attending workshops and training programs and overall knowledge of ASD.

Discussion

The objectives of this study were to determine the knowledge level of preschool teachers and to describe the sources of knowledge and the factors associated with this knowledge. Accordingly, a descriptive cross-sectional study was carried out with cluster sampling using a self-administered online questionnaire. A sample size of 211 was acquired.

The Knowledge of Autism Spectrum Disorder

In this study out of 211 preschool teachers 114 (54%), teachers had a good level of overall knowledge of ASD, 94 (46%) had good knowledge regarding risk factors of ASD and 176 (83.4%) had a good knowledge level regarding the signs, symptoms. and identification features of ASD (Table 2). In comparison to this research, studies done by Lui et al (2016) in China, and Ayoka (2018) in Ghana found that preschool teachers had a low knowledge level regarding ASD and studies done by Drusch (2015) in the USA and Taresh et al (2020) in Yemen found that preschool teachers had a moderate knowledge level regarding ASD.

The33ifferrence Is the socio-demographic factors as each of the above studies was carried out in different countries. Additionally, except for the study carried out by Lui et al (2016) in China (in which the sample size was 471), the other studies had significantly lower sample sizes than ours. The unreliability of studies with low sample sizes could account for the difference in knowledge levels.

The sources of knowledge and other factors associated with the knowledge on ASD.

It was found that there is a statistically significant association between following or that following Diploma includes а developmental disorders and overall knowledge. According to the study result majority (67.90%) of teachers who have followed or followed a diploma that includes developmental disorders had а qood knowledge level compared to the teachers who have not followed a diploma (42.3%) (Table 4). Similar results were found in a study carried out in Yemen by Taresh et al in 2019. They also found that teachers who had a diploma had a higher level of knowledge compared to teachers with bachelor's degrees and high school degrees.

Other than that, it was found that a significantly higher proportion of preschool teachers who had attended a seminar on ASD (65.4%) had good knowledge of ASD when compared to the preschool teachers who had not attended to seminar on ASD (42.3%) (Table 4). So, we can suggest that following of Diploma and attending a seminar about ASD and other developmental disorders will be helpful to them to improve their knowledge of ASD leading to better identification of children with ASD.

Regarding the individual sources of knowledge that they have gained their knowledge on ASD, electronic media is the source of knowledge for the majority (67.8%) of teachers in this study population. 50.2% (106) of the population gained their knowledge from books, 48.8% from workshops and training programs and 55.5% (117) from other people (Table 3). Electronic media was the most popular source of information. A similar result was obtained in a study carried out by Arif et al. 2013 in Pakistan where 55.3% of the teachers used electronic media as a source of information.

Books and workshops/training programs as sources of information on ASD showed statistically significant associations with overall knowledge. (Table 4). According to the above results, we can assume that there is a significant probability of gaining knowledge from books and workshops/training programs about ASD.

While electronic media (Television, radio and the internet) was the most popular source of information there was no significant association between electronic media as a source of knowledge and the overall knowledge level.

So, we can conclude that electronic media is an ineffective medium of educating people when compared to books, seminars, workshops, and training programs. One significant reason for this perception could be the challenge of distinguishing reliable sources from unreliable ones in electronic media platforms. This difficulty may undermine the credibility and educational impact of information disseminated through electronic media channels.

In our study, statistically significant associations were not found between sociodemographic factors and overall knowledge.

Acknowledgement

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Abbreviations

ASD – Autism Spectrum Disorder

IQ – Intelligence Quotient

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Keywords

Autism, Autism Spectrum Disorder, Preschool teachers.

Conflict of Interest

No potential conflicts of interest were reported by the authors.

Child Sexual Abuse: Maternal Knowledge, Consequences and Prevention Strategies in Child Welfare Clinics of Southern Sri Lanka

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Abstract

Introduction: Child sexual abuse (CSA) is a grave violation involving any sexual activity with a child by an adult or older adolescent causing profound physical and psychological trauma.

Objectives: The objective was to investigate knowledge, consequences and prevention strategies implemented against CSA among mothers as the primary caretakers of young children.

Methods A descriptive cross-sectional study was conducted in two Medical Officer of Health areas in Matara district, Sri Lanka among 106 mothers who attended child welfare clinics. An intervieweradministered questionnaire was used.

Results 51.9% of mothers had a good level of knowledge while 24.5% were poor. Mothers who had passed A/L, and those who had both male and female children were more knowledgeable regarding CSA. 89.6% were aware that both sexes were abused. Bleeding from the genital tract (93.4%) and getting pregnant (93.4%) were identified as the main physical consequences of CSA. Bed wetting or faecal passing beyond the usual age (29.2%) was poorly understood. Developing phobias (95.3%), troubled school performance (92.5%) and avoiding the opposite sex (84.9%) were identified as the main psychological consequences. Educating the child (96.2%), being vigilant regarding the child's physical (100%) and behavioural (100%) changes were the most common prevention strategies practiced. Most vulnerable situations identified were the school van (90.5%) and tuition classes (86.7%).

Conclusions: Knowledge and awareness of specific consequences of CSA was inadequate. Implementation of public health education programmes are recommended to both educate and empower society.

Introduction

Child sexual abuse (CSA) is a grave violation involving any sexual activity with a child by an adult or older adolescent causing profound physical and psychological trauma. Child Sexual abuse is defined as the involvement of a child in sexual activity that he or she does not fully comprehend, is unable to give informed consent to, or for which the child is not developmentally prepared, or else that violates the laws or social taboos of society [1]. This abuse can take various forms, including physical contact, exploitation, and exposure to inappropriate material. Initial effects such as fear, anxiety, depression, anger and hostility, aggression, and sexually inappropriate behaviour are well documented [2]. These sequelae are even more consequential as children subjected to such atrocious behaviour undoubtedly undergo long term ramifications. Frequently reported long-term effects include depression and self-destructive behaviour, anxiety, feelings of isolation and stigma, poor selfesteem, difficulty in trusting others, a tendency toward revictimization, substance abuse, and sexual maladjustment [2]. The prevalence of CSA highlights the urgent need for effective prevention and intervention strategies. The scrutiny of this matter is of utmost relevance to a country such as Sri Lanka steeped in traditionalism where certain topics are considered taboo and repressed. This burden weighs heavy on being outspoken and seeking help which is already emotionally and culturally challenging.

There are many supportive services established for sexually abused children available in Sri Lanka. UNICEF Sri Lanka and the Ministry of Women and Children Affairs (MWCA) play a significant role in combating child sexual abuse and other forms of violence against children. Additionally, civil societies, Non-government Organizations (NGOs), and religious institutions provide their support to end violence against children.

The prevalence of CSA highlights the urgent need for effective prevention and intervention strategies. Awareness and education play pivotal roles in combating this issue, particularly among key caregivers such as parents and educators. Mothers, as primary caregivers, are in a crucial position to detect early signs of abuse and take preventive measures. Therefore, understanding their level knowledge and awareness about CSA, along with the strategies they employ to protect their children, is essential for developing targeted educational and support programs.

Methods

A descriptive cross-sectional study was carried out at the Child Welfare Clinics of two randomly selected Medical Officer of Health (MOH) areas in the Matara district located in the Southern province of Sri Lanka. Mothers who attended the clinics with their children were selected via systematic sampling from the registry of clinic patients. Sample size was calculated utilizing the Cochran formula which is a standard formula used in descriptive studies. A sample of 106 participants was obtained. Mothers who had been subjected to CSA personally in the past or had children who had undergone CSA were excluded.

The interviewer-administered questionnaire was developed under the guidance of a Consultant Forensic Physician and influenced by similar studies in South India [3]. It comprised of the following sections.

Section 1: Demographic data (Mother and their child)

Section 2: Knowledge of mothers as to what encompasses as child sexual abuse

Section 3: Mothers' awareness regarding consequences of CSA

Section 4: Practised preventive strategies against child sexual abuse

Each correctly answered question was given a score of '1', while incorrect responses were given a score of '0'. Section 2 consisted of 19 questions while section 3 was divided into two subsections to assess both physical and psychological consequences of CSA. Physical consequences were assessed using 14 questions and 13 questions were used to assess psychological consequences. 12 questions were devoted to assessing the preventive strategies implemented against CSA in section 4.

A score equal to or more than 60% was considered as 'Good knowledge', a score between 30% and 59% was considered as 'Satisfactory knowledge' and a score equal to or less than 29% was Same considered as 'Poor knowledge'. percentages were used when analysing awareness consequences CSA. on of

Implemented preventive strategies against CSA was assessed under 3 measurements, namely, 'Implemented constantly', 'Implemented occasionally' and 'Never/rarely implemented' and presented using percentages.

Ethical approval was obtained from the Ethics Review Committee of the Faculty of Medical Sciences, University of Sri Jayewardenepura. Administrative approval was obtained from the Regional Director of Health, Matara District under whose purview the two MOH areas fall. Furthermore, the respective Medical Officers of Health approved the research. Informed written consent was obtained prior to administering the interviewer-administered-questionnaire.

Confidentiality and anonymity were ensured and notified via comprehensive information sheets. No data which personally identified the participants was collected. The data was used only for research purposes and participants were made aware of their ability to withdraw from the study at any time.

Result

The final sample amounted to 106 mothers. The results were analysed under four separate sections: socio-demographic characteristics, knowledge of CSA, the awareness of consequences of CSA and practiced precautions against CSA.

The vast majority of participants were Buddhist (91.5%). The majority were between 28-32 years of age (35.8%). More than half were part of nuclear families (52.8%). The majority of the sample population were unemployed (45.3%). A majority had passed advanced level examination (44.3%) while one respondent (0.9%) had received no education. An approximately equal school proportion had passed ordinary level examination (24.5%) and were educated up to a degree level (22.6%). The majority were currently married (98.1%). The sample consisted of a majority of families that had one child (39.6%); 37.7% of families had two children; 17.0% of families had three children and 5.7% families had four children. Approximately a third each of the sample families had only male children (30.2%), had only female children (34.0%) and had both male and female children (35.8%).

Characteristic	Frequency	Percentage (%)
Institute of study participation		
Dickwella MOH area	63	59.4
Matara MOH area	43	40.6
*MOH – Medical Officer of Health		
Religion		
Buddhist	97	91.5
Islam	8	7.5
Christian	1	0.9
Hindu	0	-
Age of mother (years)		
18-22	4	3.8
23-27	26	24.5
28-32	38	35.8
33-37	26	24.5
38-42	12	11.3
Above 42	0	-
Family type		
Nuclear family	56	52.8
Single parent family	16	15.1
Extended family	32	30.1
Stepfamily	2	1.9
Family income (LKR)		
Less than 30,000	21	19.8
30,000-50,000	45	43.4
50,000- 100,000	34	32.1
More than Rs.100,000	5	4.7

Table 1: Socio-demographic characteristics (n=106),

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Occupation of the mother		
Housewife	48	45.3
Student	1	0.9
Self employed	11	10.4
Private sector	13	12.3
Government sector	33	31.1
Current relationship status of mother		
Married	104	98.1
Unmarried	1	0.9
Separated	1	0.0
Divorced	I	0.9
Number of children		
One	42	39.6
Тwo	40	37.7
Three	18	17.0
Four	6	5.7
More than four	0	-
Gender of children		
Only male children	32	30.2
Only female children	36	34.0
Both male and female children	38	35.8

Table 2: Maternal knowledge on CSA (n=106),

True statements	Correct responses		
	Frequency	Percentage (%)	
Both girls and boys are sexually abused	95	89.6	
Fondling unnecessarily by an adult	44	41.5	
Touching a child where he/she doesn't want to be	63	59.4	
touched			
Forcing a child to touch an adult in areas excluding	18	17.0	
genitalia			
Exposure to sexual/pornographic photos, films, books	60	56.6	
etc.			
Making a child unnecessarily exposed/ naked by an	66	62.3	
adult.			
Constant incessant attention to a child by an	50	47.2	
adult			
Kissing the child inappropriately	38	35.8	
An adult tries to be constantly isolated with the child	50	47.2	
The driver of the school van touches the child	51	48.1	
unnecessarily			
A school student of a senior class touches the child	51	48.1	
inappropriately			
Providing chocolates, toys to children with the	44	41.5	
promise to keep quiet by any adult			
Sleeping in the same bed as the child inappropriately	37	34.9	
CSA can occur without vaginal or anal penetration	69	65.1	
A mentally impaired child is more likely to be	79	74.5	
subjected to CSA			

A majority of the sample (89.6%) accurately responded that both boys and girls were subjected to sexual abuse. However, a mere 41.5% identified fondling of the child by an adult could amount to CSA. A surprisingly low portion of the sample (17%) perceived forcing a child to touch an adult in areas excluding genitalia amounted to CSA. A slight majority of the sample (56.6%) accurately responded that exposing a child to sexual or pornographic material was a form of CSA. Almost two thirds of the sample population (62.3%) recognised that unnecessary exposure of the child amounted to abuse. A surprisingly low percentage of the sample (41.5%) accurately responded that bribing the child with toys or chocolates to be quiet about the past was alarming. Only two thirds of respondents (65.1%) accurately recognised that CSA could occur without vaginal or anal penetration. Three out of four respondents (74.5%) were aware that a mentally impaired child was more likely to be subjected to CSA.

The majority of mothers believed that the school van (91.4%), the environment of the village (85.7%) and the school environment (67.6%) were the common settings for being sexually abused. A significant 43.8% of the sample population accepted the possibility of their child/children to be sexually abused at their own house.

Analysis of study findings revealed that just half of the mothers (51.9%) had a good level of knowledge regarding CSA while 23.6% of mothers had satisfactory knowledge and an alarming 24.5% of mothers had poor knowledge regarding CSA.

Upon further analysis of the mothers with a good level of knowledge, those who had completed their O/L's, mothers aged 28-32, and those who had both male and female children were found to be more knowledgeable.

Table 3: Awareness of mothers regarding physical consequences of CSA (n=106),

Physical consequence	Correct respondents		
	Frequency	Percentage (%)	
Unexplained genital injury	89	84.0	
Recurrent vulvovaginitis	78	73.6	
Vaginal discharge or penile discharge	88	83.0	
Anal complications	61	57.5	
Pain on urination and/or passing faeces	54	50.9	
Bedwetting or faecal passing beyond the expected	31	29.2	
age			
Sexually transmitted disease	88	83.0	
Unexplained body itching	57	53.8	
Pain and redness of breast when not menstruating	57	53.8	
(female child)			

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Difficulty walking or sitting	68	64.2
Bleeding from the genital tract	99	93.4
Pregnancy	99	93.4
Wounds in the oral cavity and throat	46	43.4
Unusual smell of genital area	67	63.2

A few specific physical consequences were relatively unrecognized by the sample population. Bedwetting ad faecal passing beyond the expected age (29.2%), wounds in the oral cavity and throat (43.4%) were such consequences. Only half of the respondents were aware that pain upon urination or defaecation (50.9%), unexplained body itching (53.8%), pain or redness of the breast when not

menstruating (53.8%) were physical consequences of sexual abuse.

Almost two thirds of mothers (62.3%) had a good level of awareness regarding physical consequences of CSA while 25.5% had a satisfactory level of awareness and 12.3% of the mothers had a poor level of awareness

Table 4: Awareness of mothers regarding psycholo	gical consequences of CSA (n=106),
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Psychological consequence	Correct respondents		
—	Frequency	Percentage (%)	
Changes in hygiene, such as refusing to bathe or	74	69.8	
bathing excessively			
Developing phobias	101	95.3	
Depression	78	73.6	
Trouble in school (absence, dropping out, sliding grades)	98	92.5	
Nightmares	82	77.4	
Regressive behaviour (Re-emergence of thumb sucking)	52	49.1	
Self-harms and suicide	83	78.3	
Runs away from school or home	70	66.0	
Irritability/aggressiveness	89	84.0	
Eating disorders	69	65.1	
Poor self-esteem	98	92.5	

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Avoiding a particular adult	94	88.7
Avoiding the opposite sex	90	84.9

Psychological consequences were quite well understood throughout the sample population. The only less aware consequence was the appearance of regressive behaviours which only 49.1% were aware of. A significant majority of the sample population (89.6%) had a good level of awareness regarding psychological consequences which can be observed in an abused child while 5.7% of mothers had a satisfactory level of awareness and 4.7% of mothers had a poor level of awareness

Table 5: Practices implemented against CSA (n=106)

	Implemented constantly	Implemented occasionally	Never/rarely implemented
Preventive practice	Frequency (%)	Frequency (%)	Frequency (%)
Educating the child as to what constitutes as	76 (71.4%)	26 (24.8%)	4 (3.8%)
inappropriate/abusive			
Has explained to the child that offenders tend to	69 (64.8%)	20 (19.0%)	17 (16.2%)
threaten child to secrecy			
Communicate with parents if such instances come to	84 (79.0%)	18 (17.1%)	4 (3.8%)
pass			
Despite threats, always communicate with a trusted	82 (77.1%)	15 (14.3%)	9 (8.6%)
adult			
Being alert about child's odd physical complaints	103 (97.1%)	3 (2.9%)	0 (0%)
Being alert about child's behaviour	100 (94.3%)	6 (5.7%)	0 (0%)
Being alert about child's school performance	103 (97.1%)	1 (1%)	2 (1.9%)
Being aware of the child's friends	104 (98.1%)	0 (0%)	2 (1.9%)
Not leaving the child unattended for long durations	92 (86.7%)	4 (3.8%)	10 (9.5%)

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Having frequent observation wherever the child goes	101	5 (4.8%)	0 (0%)
	(0= 00()		
	(95.2%)		
As a parent listening to programmes on prevention	85 (80.0%)	20 (19.0%)	1 (1.0%)
of CSA			
My child has a disability/If my child were to have a	87 (89.6%)	1 (1.0%)	9 (9.4%)
disability, I would take extra precautions to			
safeguard my child as the risk is increased		119	54

The majority of preventive practices were implemented constantly. A surprising 16.2% of mothers rarely/didn't educate their children that offenders will threaten the child to secrecy following inappropriate/abusive behaviour. The mothers (86.2%) maiority of constantly implemented preventive strategies while 9.45% implemented them occasionally and 4.35% never/rarely implemented preventive any strategies against CSA.

Discussion

Analysis of the current study findings revealed that just half of the mothers (51.9%) had a good level of knowledge regarding CSA while 23.6% of mothers had satisfactory knowledge and an alarming 24.5% of mothers had poor knowledge regarding CSA. A cross-sectional survey involving 400 randomly selected parents attending a Primary Health Care Centre in Saudi Arabia revealed that most respondents (69%) had good knowledge of sexual abuse in children [4].

study conducted among health Α care professionals on the concept of child abuse in the Jaffna district of Sri Lanka using 246 participants revealed that all the groups of professionals correctly identified every form of child abuse and 61.7% had correctly identified the social indictors of child abuse [5]. This is welcome research finding since healthcare professionals being more knowledgeable of CSA is of utmost importance when compared to knowledge rates of parents. A majority of the current study sample (89.6%) accurately responded that both boys and girls were subjected to sexual abuse. Similarly, a study which was conducted in Jordan among 488 mothers revealed that 93.9% of Jordanian mothers were aware that boys were also likely to be subjected to sexual abuse [6]. This is an important finding in both cultural contexts since being unaware of sexual abuse experienced by young boys would be extremely damaging to society.

A mere 41.5% of the current study population identified that fondling of the child by an adult could

amount to CSA. A surprisingly low portion of the current sample (17%) perceived forcing a child to touch an adult in areas excluding genitalia amounted to CSA. A slight majority of the current sample (56.6%) accurately responded that exposing a child to sexual or pornographic material was a form of CSA. Almost two thirds of the sample population (62.3%) recognised that unnecessary exposure of the child amounted to abuse. A systematic review discovered that the kinds of abuse that appeared to be the most damaging were experiences involving father figures, genital contact, and force [7].

significant 43.8% of the current sample Α population accepted the possibility of their child/children to be sexually abused at their own house. A similar proportion of pre-school teachers (50%) reported that CSA can be perpetrated by close family members. However, 72% of teachers reported that CSA prevention programs would induce too much of knowledge about sex [8]. This relates to the important notion of developing structured programs in institutions such as preschools which are age appropriate since abusive behaviour cannot be ruled in the home environment. Three out of four respondents of the current study (74.5%) were aware that a mentally impaired child was more likely to be subjected to CSA. Similarly, a study conducted in Tamil Nadu, India revealed that 88.2% of mothers believed that physical and mental disability in children was a risk factor for CSA [3]. This emphasizes the importance of implementing even more stringent safety precautions when it comes to the care of such disabled children.

A cross-sectional study conducted in Jordan found that genital and /or anal injury & unexplained soreness or bruises around genitals were the commonly associated physical symptoms of CSA which were identified by mothers [6]. Similarly, our study yielded that mothers were aware that unexplained genital injury (84%), anal complications (57.5%), difficulty walking or sitting (64.2%), bleeding from the genital tract (93.4%) were the commonly encountered physical

consequences in a sexually abused child. Surprisingly, a mere 43.4% of mothers were aware that CSA would present as wounds/redness in the oral cavity and throat. A cross-sectional study conducted among mothers of primary school children in Tamil Nadu, India concluded that 76.9% of mothers had the awareness of unexplained genital injury was seen in child sexual abuse; 13.4% were aware of recurrent vulvovaginitis and 15.1% were aware of vaginal or penile discharge seen in sexually abused children [3]. The results of our study, while being comparable on awareness of unexplained genital injury (84%), a higher proportion of our study population were aware of vulvovaginitis (76.4%) and vaginal or penile discharge (83%). Only 9.7% of Indian mothers were aware of bed wetting and faecal soiling beyond the usual age as a possible result of CSA [3]. This physical consequence was also relatively poorly understood among Sri Lankan mothers (29.2%).

A meagre 12.9% of South Indian mother had awareness of anal complaints; 14.5% had awareness of pain on urination and 24.7% had awareness that sexually transmitted infections were associated with child sexual abuse [3]. Comparatively, our study revealed that 57.5% were aware of anal complications, 50.9% were aware of painful urination or defaecation and 83% of the current study population were aware that sexually transmitted diseases could be seen in children who were subjected to CSA.

A cross-sectional study conducted in Egypt revealed that the most dangerous complication anticipated following CSA was depression and it was experienced by more than half of the study population [9]. Similarly, 73.6% of our study population were aware that depression was an important psychological consequence of CSA. This is vital to be given considerable attention since childhood depression has many long-lasting consequences burdening not only the child but the healthcare system and society at large for years to come. Adolescent suicide is extremely concerning, and the impact of CSA should not be taken lightly since CSA is frequently under-reported.

The psychological consequences of CSA are arguably more consequential than physical consequences. The hidden trauma, which is not freely discussed or counselled in a deeply traditional country like Sri Lanka where such topics are associated with social stigma, should be properly handled by medical professionals along with the trusted relatives to ensure the child doesn't suffer continuously. A literary work published on child and adolescent psychiatry documents that, children were affected adversely immediately or even later, the mental health of many was harmed in a variety of ways including depression, PTSD, low self-esteem and anxiety. self-harm, inappropriate sexual behaviour and conduct disorder. Harm was also found to extend into particular adulthood [10]. More specifically. emphasis was found to be warranted to address the two primary adjustment concerns known to affect sexually abused individuals: Type II or complex posttraumatic stress disorder (PTSD) and sexuality conditions [11].

A cross-sectional study conducted in Southern India revealed that 56.5% of mothers had the awareness regarding the problems at school; 83.9% had the awareness regarding acute traumatic response such as clingy behaviour and irritability and 54.8% had the awareness regarding sleep disturbances [3]. Contrastingly, our study revealed that 92.5% of mothers were aware of difficulty with schoolwork, 84% were aware of difficulty or aggressiveness and 77.4% were aware of nightmares disturbing sleep as consequences of CSA. This reflects on the better understanding of Sri Lankan mothers regarding the various psychological consequences of CSA.

With regard to preventive strategies, a study conducted in Jordan revealed that 74% mothers believed CSA could be prevented by educating children [6]. Another study conducted among parents of pre-schoolers concluded that 59.1% discussed the dangers of child sexual abuse with their children.72.5% of the parents believed that all preschools and daycare centres should conduct child sexual abuse prevention programmes [12]. However, a higher percentage of mothers of our study educated their children, either constantly (71.4%) or occasionally (24.8%). Most of the mothers of children attending a primary school in China (60%) had already instructed their children to not allow strangers to touch their private organs and to say "No" if they felt threatened or uncomfortable [13]. An overwhelming majority of our study population (99%) stated they would actively participate in programs aimed at disseminating knowledge on preventing CSA.

The peak age of vulnerability has been found to be between 7 and 13 years which is an extremely impressionable age where young children undergo the already challenging and exploratory period of puberty. A systematic review concluded that cognitive-behavioral therapy (CBT) of the child and a nonoffending parent is the most effective treatment. This underlines the extremely important effect a trusting and loving parent has on preventing and recovering from CSA. Future studies should focus on implementing preventive programs and assessing their effectiveness.

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Conflicts of Interests

There are no conflicts of interest.

Abbreviations

CBT – Cognitive Behavioral Therapy

CSA - Child Sex Abuse

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15 Putnam, F. W. (2003, March). Ten-Year Research Update Review: Child Sexual Abuse. Journal of the American Academy of Child & Adolescent Psychiatry. Elsevier BV. http://doi.org/10.1097/00004583-200303000-00 Knowledge of insulin therapy, emergency management, chronic complications and their associated factors among adult patients with type 1 diabetes attending the National Diabetes Centre - Rajagiriya

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Abstract

Introduction:

Type 1 diabetes mellitus (T1DM) is a growing concern in Sri Lanka and preventing long-term disease-related complications and reducing the frequency of emergency management of episodes is a challenge for these patients.

Objectives:

To describe the knowledge on insulin therapy, emergency management, chronic complications and their associated factors among adult patients with T1DM attending National Diabetes Center – Rajagiriya.

Results:

The majority (70%) were between 18-27 years of age with a mean age of 25.54 years (SD=5.690). The age of disease onset was less than 15 years among 82% of patients. Mean Knowledge scores on chronic complications, insulin therapy and emergency management were 81.49(SD=0.5) 67.76(SD=0.49), 42.92(SD=0.5) respectively. Those with higher education had better knowledge of insulin therapy, chronic complications and emergency management (p<0.05).

Conclusions:

The majority had satisfactory knowledge scores for insulin therapy and chronic complications but poor knowledge scores for emergency management. Therefore, patient education, awareness and empowerment on more specific issues related to the emergency management of this lifelong disease is beneficial.

Keywords: Type 1 Diabetes patients, knowledge, insulin therapy, chronic complications, emergency management

Introduction

Type 1 diabetes mellitus (T1DM), also known as autoimmune diabetes, is a chronic disease characterized by insulin deficiency due to pancreatic β-cell loss and leads to hyperglycaemia. Although the age of symptomatic onset is usually during childhood or adolescence, symptoms can sometimes develop much later. Although the aetiology of T1DM is not completely understood, the pathogenesis of the disease is thought to involve T cell-mediated destruction of β-cells [1].

Type 1 diabetes (T1DM) is usually diagnosed before the age of 40, although occasionally people have been diagnosed later after an illness which causes the immune response to trigger it. According to the data of the National Diabetes Centre in Sri Lanka, out of the 672 patients, the age at diagnosis ranged from birth to 44 years, and the majority of patients, 526 (78.3%) were diagnosed before 15 years of age [2].

Chronic complications in T1DM can be broadly categorised as microvascular and macrovascular. Microvascular complications include mainly diabetic kidney disease, neuropathy, and retinopathy. Poor glycaemic control and longer duration of diabetes are the most important determinants of microvascular complications in Type 1 diabetes. According to t medical reports in Denmark, the prevalence of moderate to severe retinopathy ranged from 23%-59% while the prevalence of neuropathy ranged from around 30%–60% and diabetic kidney disease defined as micro or microalbuminuria affected up to 30% of persons with Type 1 diabetes. Macrovascular complications include mainly coronary artery disease, peripheral artery disease, and stroke. Most of the macrovascular complications are associated with atherosclerotic plaque formation due to impairment of lipid metabolism [3].

Diabetic ketoacidosis (DKA) is a common but potentially fatal medical emergency among

people with type 1 Diabetes mellitus, there are ~6000 episodes per year in the UK. [4].

Fifteen to sixty-seven per cent of patients with new-onset type 1 diabetes mellitus (T1DM) present with diabetic ketoacidosis (DKA), of which approximately 79%, initially present to their general practitioner.

Diabetic ketoacidosis is the most common cause of diabetes-related deaths, mainly due to cerebral oedema that occurs in 0.3-1% of patients. Measurement of ketone bodies is recommended for patients with T1DM during acute illness when blood glucose is elevated above 300 mg/dl or when patients have signs of ketoacidosis. Treatment of DKA focuses on normalising blood glucose and treating precipitating factors to prevent a recurrence [5].

Methodology

A descriptive cross-sectional study was conducted among 228 people above 18 years with T1DM, on treatment for at least one year duration attending National Diabetic Center -Rajagiriya from November 2020 to May 2021. Those with physical and mental disability were excluded. The sample size was calculated using the formula for estimation of proportions in descriptive studies [7]. A standard normal deviation for specified alpha error was set at 1.96 which corresponds to 95%, while precision was set at 0.05. The proportion of adequate knowledge of the T1DM in adolescents with longer the time of diagnosis was 26% [8]. With a non-response of 5%, the final sample size was 326. Patients who fulfilled the inclusion criteria and who attended the clinic during the study period were selected.

Self-administered questionnaires were circulated as Google Forms which was designed after the face validity by the Endocrinologist. Data was collected through printed questionnaires from patients attending the clinic while for those not attending the clinic due to COVID restrictions, Google forms were used. Each correct statement of knowledge was given 1 mark and zero for incorrect/ don't know the response. Knowledge score was categorised using the mean knowledge. Those who scored above mean as good knowledge and those below mean score as poor knowledge. Descriptive statistics were performed and analysed, and their associations were established using the chi-square test from the SPSS software version 23. P<0.05 was taken as the significance level.

Hypoglycemia is defined as blood glucose < 70 mg/dl. The annual prevalence of severe Hypoglycaemia is around 30% in people with type 1 DM [6].

Structured training in insulin self-management reduces both rates of ketoacidosis and severe hypoglycaemia, requiring emergency treatment. This study reinforces the importance of making high-quality structured education more readily available to people with type 1 DM [4]. There is scarce research done among T1DM patients to assess their knowledge regarding the disease, insulin treatment and emergency management. Thus, this study aimed to describe the knowledge of insulin therapy, emergency management, chronic complications and their associated factors among adult patients with T1DM attending the National Diabetes Centre – Rajagiriya.

Results:

The response rate was 77%. (Total sample size-228) The majority (68.9%) were in the 18-27 age group. The mean age of the study population was 25.54 (SD = 5.690) years. The majority of the participants were male (53.5%), unmarried (74.1%) and Sinhalese (86.8%). More than half of the population had passed A/Ls.

The mean age at the time of diagnosis was 10.74 (SD = 4.4449) years. Disease onset was at less than 15 years of age among 82% of the patients (Table 1).

Table 1	I Socio-demographic	and socio	economic f	actors o	of the j	participants

Characteristics	Frequency	Percentage
Age		
18-27 years	157	68.9
28-37 years	61	26.8
38-47years	10	4.4
Gender		
Male	122	53.5
Female	106	46.5
Ethnicity		
Sinhalese	198	86.8
Tamil	15	6.6
Muslim	12	5.3
Other	3	1.3
Civil status		
Married	59	25.9
Unmarried	169	74.1
Divorced/Separated	0	0
Level of education		
Only primary education	4	1.8
Below O/L*	45	19.7
Passed O/L	57	25.0
Passed A/L**	79	34.6
Currently employed		
Yes	87	38.2
No	141	61.4
Monthly family income (Rs)		
<25000	82	36.0

25001-50000	103	45.2
>50000	43	18.9

The mean knowledge score of insulin therapy was 62.761(SD = 0.49876). The mean knowledge score regarding acute and chronic complications was 42.9247 (SD = 0.50079) and 81.4912 (SD = 0.50041) respectively.

The knowledge was categorised according to the mean score 45.2% had good knowledge of insulin therapy, 48.2% had good knowledge of acute complications and 52.6% had good knowledge of chronic complications of DM (Figure 1).





According to Table 2, awareness of glycaemic targets was satisfactory with 96% being aware of their pre-meal blood glucose target of 80-130

mg/dl, 78.9% on postprandial targets, 69.3% on target levels at awakening and 60% of bedtime targets.

Table 2: Awareness regarding glycaemic targets.

Blood glucose	Frequency			Total
uigot	Yes (%)	No (%)	Not sure (%)	
Pre meal 80- 130mg/dl	219(96.1)	9(3.9)	0	228
2hr Post meal below 180mg/dl	180(78.9)	48(21.1)	0	228
On awakening 100-130mg/dl	158(69.3)	70(30.7)	0	228
At bed-time 115- 145mg/dl	137(60.1)	91(39.9)	0	228

The majority of the participants were aware of the microvascular complications. However,

awareness regarding macrovascular complications was less (Table 3).

Table 3: K	nowledge on	chronic com	plications of	poorly	controlled	diabetes.

Awareness on chronic complications	Frequency (%)		
	Yes (%)	No (%)	Not sure (%)
Damage to kidney (nephropathy).	213 (93.4)	10(4.4)	5(2.2)
Impaired vision / visual problems	205(89.9)	11(4.8)	12(5.3)
Cardiovascular problems.	159(69.7)	34(14.9)	35(15.4)
Reduce/altered sensations in the feet	170(74.6)	24(10.5)	34(14.9)
Foot ulcers	182(79.8)	20(8.8)	26(11.4)

Statistically significant association with good knowledge of insulin therapy was only demonstrated with those having an education above ordinary level (p<0.05). Surprisingly, those who were unemployed had better

knowledge compared to those who were employed (50.7% vs 36.8%) and this difference was statistically significant (p<0.05). Other socio-demographic and economic variables did not show any significant association. (Table 4) Table 4. Association between socio demographic / economic factors and knowledge on Insulin therapy

Characteristic	Kno	wledge			Total	Signifi	Significance value		
	Goo	d	Ροοι	r	Frequency				
	No.	%	No.	%	No. (%)	X ²	df	Ρ	
Age									
Above 30 years	15	37.5	25	62.5	40(100%)				
Below 30 years	88	46.8	100	53.2	188(100%)	1.154	1	0.283	
Gender									
Male Female	51 52	41.8 49.1	71 54	58.2 50.9	122(100%) 106(100%)	1.205	1	0.272	
Marital status									
Married	27	45.8	32	54.2	59(100%)	0.011	1	0.916	
Unmarried Other	76 0	45.0 0	93 0	55.0 0	169(100%) 0				
Level of education									
Above O/L	90	50.3	89	49.7	179(100%)	8.760	1	0.003	
Below O/L	13	26.5	36	73.5	49(100%)				
Disease duration Below 10 years	27	52.9	24	47.1	51(100%)	1.622	1	0.203	
Above 10 years	75	42.9	100	57.1	175(100%)				
Monthly family income	(Rs)								
< 25000	(110)	37	45.1	45	54.9	82(100			
>25000		66	45.2	80	54.8	%) 146(10 0%)	0.000	1	0.99 0
Employment						0,0,			Ŭ
Employed		32	36.8	55	63.2	87(100 %)			
Unemployed		71	50.7	69	49.3	140(10 0%)	4.202	1	0.04 0

Table 5 depicts the association between sociodemographic factors and knowledge of acute complications. Participants who had an educational level above the ordinary level had better knowledge compared to those who had an educational level below O/L (52.5% vs 32.7%). This observed difference was statistically significant (p<0.05). None of the other factors showed any significant difference (p>0.05).

Table 5: Association between socio demographic factors and knowledge on acute complications

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Association of socio demographic factors	Knowl	edge			Total	Significa	ance valu	e
	Good		Poor		Frequency	X ²	df	Ρ
	No.	%	No.	%	No. (%)			
Age								
Above 30 years	15	37.5	25	62.5	40(100%)	2.243	1	0.134
Below 30 years	95	50.5	93	49.5	188(100%)			
Gender	50	45.0	00	F A A	400/4000/)	0 577	4	0.447
Male	90	45.9	00	54.1	122(100%)	0.577	.1	0.447
Female	54	50.9	52	49.1	106(100%)			
Marital status								
Married	31	52.5	28	47.5	59(100%)			
Unmarried	79	46.7	90	53.3	169(100%)	0.589	1	0.443
Other								
Level of education								
Below O/L	16	32.7	33	67.3	49(100%)			
Above O/L	94	52.5	85	47.5	179(100%)	6.077	1	0.014
Disease duration								
Below 10 years	21	41.2	30	58.8	51(100%)			
Above 10 years	88	50.3	87	49.7	175(100%)	1.312	1	0.252

Discussion

Our study showed that awareness of glycaemic targets was satisfactory with 96%, 78.9%, and 60% being aware of pre-meal, postmeal, and bedtime glycaemic targets. Good knowledge was seen on insulin storage and transportation among 97.8% and 96.1%, respectively. The awareness of the site of insulin injection among the participants is as follows: thigh 57.5%, abdomen 71%, and upper part of the arm 65.8%. In our research findings, 97.8% were aware that insulin should be stored in the middle compartment of the refrigerator.

According to a cross-sectional study conducted by Metu Karl Heinz Referral Hospital in 2019, more than three-fourths (78.9%) answered that insulin injection should be done before taking a meal or just soon after a meal. One hundred sixty-seven (69.0%) correctly answered that sites for insulin injection are the abdomen, thigh, glutei, and deltoid. More than half (56.2%) answered that an insulin vial is stored in the refrigerator or cold place, or sand soaked with water. One hundred eighty-five (76.4%) correctly answered that rotation of the injection site is used to reduce pain and prevent wasting of subcutaneous tissues.

In our study, only 45.2% had a good knowledge of insulin therapy. As a person living with T1DM is dependent on insulin and requires multiple injections per day, these findings highlight the urgent need to educate and train these young people regarding insulin storage, transportation, and injections. A similar study was reported by Yosef et al., where only 38.4% of respondents had a good knowledge of insulin therapy. The sample size for this research was 245.

Our study highlighted good knowledge regarding chronic complications such as diabetic kidney disease, eye disease, and foot disease. The National Diabetic Centre provides an annual assessment of these complications, and therefore, this is likely the reason for increased awareness regarding this complication.

The majority (79%) of patients knew about foot ulcers, and 74.6% of the proportion knew impaired sensation in the feet. The least (69.7%) known chronic complication among study participants was cardiovascular complications. As this is a young patient population and may not have undergone regular screening for cardiovascular disease, this perhaps may have caused less awareness regarding this important complication. However, as cardiovascular disease is one of the leading causes of mortality among these patients, more awareness must be created. Contrasting results were observed in a similar study done in Ghana, where the knowledge of these complications was quite low.

In our research, knowledge of chronic complications of T1DM had the highest mean score, and 52.6% of patients had good knowledge. A cross-sectional study conducted in the Medical B Unit of the Department of Medicine Khyber Teaching Hospital, Peshawar among 96 patients reported only 36 (37.50%) had good, 24 (25%) had average, and 36 (37.50%) had poor knowledge about diabetes complications. In this study, they had categorized the knowledge of complications into three parts, whereas in our study, two parts. The sample size was low compared to our study.

Our research demonstrated that 51.8% had poor knowledge regarding acute complications, which was scored based on statements regarding symptoms, reasons, and actions to be taken during hypo/hyperglycaemia. However, their knowledge of hypoglycaemia (91.7%) and hyperglycaemia (91.2%) was reported good. This may be because our patients most commonly experienced these two emergencies, and allergies to insulin were rather rare.

In our research, there was no significant association between knowledge of insulin therapy and age. Our findings showed that those who were of higher educational level had better knowledge of insulin therapy, and this was statistically significant. Similar results were obtained by a study done in Metu - Karl Heinz Referral Hospital from January 01-30, 2019, in Ethiopia, where the respondents who achieved secondary school and above had three times increased odds of having good knowledge of insulin therapy.

In our research, there were no significant differences with gender or marital status. When

discussing the disease duration, our findings demonstrated that for the participants who used insulin below ten years, 52.9% of participants had a good knowledge, while 42.9% of participants who used insulin above ten years had a good knowledge. However, there was no significant association between knowledge of insulin therapy and the disease duration. In contrast, research done in Ethiopia had 3.7 increased odds of having good times knowledge of insulin therapy than those who used insulin for less than five years. The difference observed in our study and the abovementioned study was probably due to our sample having a higher percentage of participants below 30 years.

In our study, the results showed that those who were unemployed had a better knowledge of insulin therapy compared to those who were employed. This might be due to a high proportion who have finished their exams and may be looking for a job and will fall under the unemployed category, whereas those who have dropped out of school are employed in small jobs.

Limitations:

Due to the COVID-19 pandemic, only a few patients came to the National Diabetes Centre. The response rate on WhatsApp and Google Forms was also limited. The mean knowledge scores were calculated based on their mean knowledge score. Therefore, the reduced sample size may have affected the results.

Conclusions:

The majority of the participants (52.6%) had a good knowledge of chronic complications of T1DM. However, the majority of the patients had poor knowledge of insulin therapy (54.8%) and acute complications management (51.8%). However, patients who had been educated above ordinary levels had significantly better knowledge (p<0.05) on insulin therapy, acute complications, and better overall knowledge of T1DM. There was no significant difference between the level of education and knowledge of chronic complications. Unemployed patients had better knowledge of insulin therapy compared to employed patients, and this association was statistically significant (p<0.05).

Recommendations:

To increase patient education and awareness on more specific issues related to T1DM, such as insulin storage, administration, recognizing warning symptoms, initial selfmanagement, and when to seek urgent medical attention during acute complications such as hypoglycaemia and diabetic ketoacidosis. This will help empower patients with this lifelong disease to self-manage their disease condition more optimally.

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Conflicts of Interest:

There is nothing to declare.

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Peer-assisted learning: a perspective of an Asian Medical School

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Abstract

Background: Peer-assisted learning (PAL) has been practised informally in Sri Lankan medical schools for several years. This study explored the current practice, the students' perceptions and drawbacks of PAL.

Methods: A descriptive cross-sectional study was conducted among 115 final-year students and 38 immediate graduates of the Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka.

Results: The PAL sessions exhibited high popularity, particularly in the first two years (98.7%). The most preferred teaching sessions were Multiple Choice Questions (94.2%), Structured Essay Questions (93.9%), clinical case teaching (93.6%), and lectures (91.4%). A significant majority of students (90.13%) perceived PAL sessions as effective for exam success. Key reasons supporting PAL sessions included their ease (94.1%), bridging knowledge gaps (87.5%), providing a platform for addressing doubts freely (81%), and being exam-oriented (83%) (p<0.01). A majority (51.33%) expressed a desire for PAL sessions to be formally integrated into the curriculum (p<0.01). The primary drawback identified was the inadequacy of resources for teaching and learning (59.86%).

Conclusion: The results suggest that PAL is an effective and widely accepted teaching method in our medical school and most students feel that it should be incorporated into the formal curriculum as a supplementary teaching process.

Key words - Cross-Sectional Studies, Schools, Medical, Sri Lanka, Curriculum, Students, Faculty

Introduction

Peer-assisted learning (PAL) is based on the key principle that peers help each other to learn, consolidate and improve their knowledge[1], [2]. It is a process whereby there is the acquisition of knowledge and skills through active help and support by peers[3] In the ever-evolving landscape of education, peerassisted learning has garnered significant attention for its potential to enhance the learning experience beyond traditional instructional methods.

Teaching is an integral part of a doctor-patient relationship. Engaging in such training would help them to develop their communication skills better. Further, exposing the medical students for teaching early in their career, will give them a better understanding and experience of the principles of teaching and learning which will enable them to become lifelong learners. As medical educators strive to prepare competent and compassionate physicians, understanding how peer interactions contribute to the holistic growth of medical students becomes essential.

PAL is being practised in some medical schools as a part of the formal curriculum. In the UK there is a formal student-led PAL scheme to teach clinical skills to third, fourth and fifth-year students [4]Certain medical schools offer senior medical students, the opportunity to teach junior medical students where fourth-year students participate in the teaching of first and second years in small group discussions and laboratory exercises[5] Peer-assisted learning is a vital aspect of active learning in medical education, enhancing knowledge retention and metacognitive awareness. In a peer-supported environment, students feel less apprehensive about making mistakes compared to interactions with faculty. This fosters collaborative problem-solving, providing numerous opportunities for students to identify and correct errors before examinations, and facilitating the effective development of clinical skills through continuous practice.[6]

In Sri Lankan medical schools, PAL is not a component of the formal medical curriculum. However, it is well-known that PAL has existed for many years in several medical faculties as an informal learning process. This process is organised by groups of successful students and is conducted in an informal manner parallel to

the formal teaching. Although the faculty teachers were aware of this teaching process, they neither facilitated nor discouraged this. Participation in these classes is entirely voluntary.

In the Faculty of Medical Sciences, University of Sri Jayewardenepura too, PAL sessions have been conducted mainly aimed at the first two years. The so-called difficult topics have been discussed in these classes. Teaching methods consist principally of lectures and small group teaching sessions. These classes conducted closer are usuallv to the examinations. Repeat exam campaigns are also conducted for the unsuccessful students, mainly by the students who had succeeded at the first attempt both from the same year and senior batches. The graduates who had passed the most recent final MBBS examinations and were appointed as demonstrators in various departments of the faculty conduct informal clinical classes, exam-oriented theory. questions and answer sessions for students.

There has been only one published Sri Lankan qualitative study exploring students' experiences with *PAL* classes[7]. The study concluded that this student-initiated PAL process appears to be succeeding for the students. Their experiences may help implement a PAL process or even improve the formal teaching processes by incorporating PAL into the curriculum.

The purpose of our study is to explore the current practice of PAL, the perceptions of the final year medical students and immediate graduates in the Faculty of Medical Sciences, University of Sri Jayewardenepura, on the effectiveness of PAL and the drawbacks of PAL.

Methods

The Descriptive cross-sectional study was conducted among all the medical students who were in their final year in 2013 & those who had completed their Final MBBS in the year 2012 and Working temporarily as a demonstrator in the Faculty of Medical Sciences, University of Sri Jayewardenepura. Data were collected by a self-administered questionnaire and analysed using SPSS 17.0 software. A pretest was carried out to identify the pitfalls in the questionnaire. A total of 153 questionnaires were analysed, out of which 115 were final-year students and 38 were demonstrators. The questionnaire was distributed voluntarily after obtaining informed consent from the participants. No personal details were obtained. Our study did not include any interventions on participants. Hence after discussing with the ethical approval committee of the Faculty of Medical Sciences, University of Sri Jayewardenepura no ethical issues were identified related to our stud

The statistical analysis including demographical analysis was conducted using Microsoft Excel 2013, R software (version 4.0.3), and R-Studio (version 1.4.1106). Graphical analysis was also carried out using Excel 2013 and the proportions of the response rates concerning each factor were assessed under separate sections according to the questionnaire.

Results

Current practice of PAL:

Almost all students (99.3%) had participated in the PAL process either as learners or tutors at some stage of their medical career. Participation only as a learner, only as a tutor and as both learner & tutor were 49.7%, 3.3% 47.1% respectively.

As a learner the percentages of student participation in PAL sessions before the exams of 1stMBBS, 2nd MBBS Part 1, 2nd MBBS Part 2 and Final MBBS examinations were 98.7%, 40.4%, 55% and 31% respectively. The student participation for PAL lectures was 86.5%, multiple choice questions 67.6%, structured essay questions 54.7% and clinical case discussions 43.6%.

Most students felt that MCQ discussions (94.2%), clinical case discussions (93.6%) and SEQ discussions (93.9%) were almost equally useful as lectures (91.4%).

Throughout the five years, the majority of the students' frequency of attendance for the PAL sessions conducted for the main exams was in the range of 1-2 times a week to less than once a month. However, 33.8% of students had never attended PAL sessions before the 2nd MBBS part 2 examination in the fourth year.

The tutors for the PAL session were a batch mate, a senior colleague or an immediate graduate. The senior colleague was the common tutor up to 2^{nd} MBBS Part 2 and an immediate graduate was the common tutor for the final exam.

Physiology (90.7%), followed by Anatomy (88.1%), Community Medicine (59.6%) and Biochemistry (52.3%) were the subjects to which most attended a PAL session. The attendances for Forensic Medicine, Family Medicine and Obstetrics and Gynaecology were lowest at 6%, 4.7%, and 2.6 % respectively.

Most students felt that during the following exam, PAL sessions should be conducted 1-3 months before 1st MBBS (44.4%), 2nd MBBS Students felt that PAL should be included in the formal curriculum and further provided numerous benefits as listed in Table 1. Part 1 (34.6%) and 2nd MBBS Part 2 (37.3%). In the final year most students (30.7%) felt that PAL should be conducted 1-2/ weekly and daily for the repeat examination.

Most students felt that peer teaching could improve their knowledge (86.5%), teaching skills

(85.9%), and communication skills (82.4%). In addition, they think it helps to pass examinations

(93.9%) and to build up a good relationship with junior colleagues (65.9%) (p<0.01).

Table 1. Students' views on benefits and drawbacks of currently practised PAL sessions in
comparison to formal curriculum

	Agree	Neutral	Disagree	Total	p-value
PAL should be incorporated into the formal curriculum	77 (51.33%)	45 (30%)	28 (18.66%)	150	<0.01
PAL should be conducted	46 (32%)	54 (37%)	43 (30%)	143	0.507
PAL helps in adapting from school teaching to university teaching	94 (62.2%)	38 (25.1%)	19 (12.5%)	151	<0.01
PAL helps to fill the knowledge gaps that exist in the formal teaching sessions	134 (87.5%)	18 (11.7%)	1 (0.6%)	153	<0.01
PAL sessions help in overcoming language difficulties encountered in learning	82 (53.94%)	43 (28.28%)	27 (17.76%)	152	<0.01
PAL helps to clarify doubts more freely than in formal lectures	124 (81%)	22 (14.37%)	7 (4.57%)	153	<0.01
PAL sessions cover a larger subject area within a shorter period	124 (81%)	21 (13.7%)	8 (5.2%)	153	<0.01
PAL sessions are conducted in a more relaxing and a stress-free environment	122 (79.73%)	26 (16.99%)	5 (3.26%)	153	<0.01
PAL sessions use easier teaching methods that help them to remember the lessons learnt better	144 (94.1%)	8 (5.2%)	1 (0.6%)	153	<0.01
PAL is useful in achieving good grades and passing examinations	137 (90.13%)	10 (6.57%)	5 (3.28%)	152	<0.01
PAL sessions are more exam- oriented than the formal teaching sessions	127 (83%)	18 (11.76%)	8 (5.22%)	153	<0.01

There is a higher chance of learning wrong/ outdated facts in PAL than the formal teaching	52 (34.4%)	69 (45.6%)	30 (19.8%)	151	<0.01
The resources available for teaching & learning in PAL sessions are relatively less than in formal teaching	91 (59.86%)	33 (21.71%)	28 (18.42%)	152	<0.01
There is a higher chance of deviating from the topic	24 (15.78%)	50 (32.89%)	68 (44.73%)	152	<0.01

When asked about the preferred media of instruction of PAL sessions, 68.4% felt that it should be conducted in both Sinhala and English whereas 21.6% preferred it to be conducted only in Sinhala and 9.9% only in English.

Discussion

The comprehensive analysis of peer-assisted learning (PAL) participation and preferences among medical students reveals compelling insights into its widespread adoption and perceived effectiveness.

To comment on the participation pattern an overwhelming majority of students (99.3%) have engaged with PAL at some point in their medical career, either as learners, tutors, or both. The diverse participation modes, with nearly half of the students engaging in PAL as both learners and tutors, underscore its integral role in the medical education landscape.

The distribution of student participation in PAL sessions before various examinations provides valuable context. The high involvement before 1st MBBS exams indicates its perceived importance in foundational learning, while variations in participation across subsequent years suggest evolving study strategies. Notably, a substantial percentage of students had not attended PAL sessions before 2nd MBBS Part 2, highlighting potential gaps in engagement during this critical period.

The variance in attendance across different subjects signifies varying student preferences and perceived challenges. Physiology and Anatomy emerge as the most attended PAL sessions, reflecting their perceived complexity. Conversely, lower attendance in certain specialities may indicate areas where students feel less need for collaborative learning or potential curriculum gaps.

The students' overwhelmingly positive perception of PAL sessions as equally

beneficial as traditional lectures underscores the effectiveness of this pedagogical approach. Notably, MCQ discussions, clinical case discussions, and SEQ discussions are perceived as highly valuable, emphasizing the diverse benefits PAL offers in different learning contexts.

The frequency preferences for PAL sessions before different examinations reflect nuanced student needs throughout their academic journey. The variability in preferences suggests the importance of flexible PAL scheduling aligned with the academic demands of each phase.

Students acknowledge the multifaceted benefits of PAL, attributing its effectiveness to knowledge enhancement, improved teaching and communication skills, and exam success. The recognition of PAL's role in fostering positive relationships with junior colleagues underscores its potential impact beyond academic realms.

The diverse preferences regarding the language of instruction for PAL sessions highlight the importance of catering to linguistic diversity among medical students. Striking a balance between Sinhala and English instruction might enhance inclusivity and engagement.

The graphical representation comparing PAL with the formal curriculum suggests a nuanced relationship, indicating that students perceive PAL as a valuable complement rather than a substitute. This aligns with the notion that PAL serves to enrich and reinforce formal learning structures.

The identified qualities expected from PAL teachers underscore the importance of approachability, subject expertise, and effective communication. These attributes align with the student-driven nature of PAL, emphasizing the role of peer educators as facilitators rather than traditional instructors.

Conclusion

PAL is widely accepted and practiced in our medical school. PAL sessions are most sought after at the beginning and the end of the medical course. Most of the students reckon the PAL sessions to be effective in getting through examinations in addition to gaining knowledge. There were hardly any drawbacks from the perspectives of the students towards PAL except for the lack of resources for teaching and learning.

As the majority of the study population feels that the PAL sessions should be encompassed in the formal teaching curriculum, this should be seriously explored further, at higher levels of the curriculum development committee. Supervision the accuracy of knowledge taught PAL sessions, providing suitable at environmental facilities to hold these sessions, training the peer teachers, scrutinizing the study materials, making more model questions available for the discussions and regularizing the present ad-hoc sessions are some of the measures the faculty members could provide to make PAL sessions more useful.

Ethics approval and consent to participate: Consent and Ethics approval from the research committee of the Colombo South Teaching Hospital. Our study did not include any interventions on participants.

Consent for publication: Consent implied

Availability of data and material: The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

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List of Abbreviations:

PAL: Peer Assisted Learning USJP: University of Sri Jayewardenepura MCQ: Multiple Choice Questions SEQ: Structured Essay Questions

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