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Understanding Water Pollution in the Kelani River Basin: A Comprehensive Literature Review on Causes, Ecological Impact, and Management Strategies

By MSP Sumaiya[1]

ABSTRACT

A growing body of research indicates that water pollution affects aquatic ecosystems negatively and is a widespread problem. This research focuses on the Kelani River basin in Sri Lanka since there are serious problems with water pollution there, despite the fact that contamination impacts many water bodies globally. This research primarily relies on secondary data collection methods, including research articles, journals, publications, annual reports, and official internet sources. The collected secondary data underwent qualitative analysis, which subsequently contributed to the presentation of descriptive findings in this study. Through the research, the researcher identified two main causes of water contamination in the Kelani River basin: point sources and non-point sources. Over 9,000 industrial establishments contribute significantly to pollution. Additionally, hydropower construction affects 30% of the river's course. Furthermore, the Kelani River basin holds ecological significance as a habitat for numerous endangered and endemic species, including critically endangered and narrow-range endemics such as Balanocarpus kitulgalensis, Vetica luwesiana, Pethia bandula, and Systomus asoka. Recognizing the urgency of water conservation, we propose comprehensive strategies: stringent regulations, sustainable land use, effective waste management, critical ecosystem protection and restoration, and community engagement. Furthermore, maintaining the ecological integrity of the Kelani River and its benefits to human well-being requires tackling both point and non-point causes of pollution.

KEYWORDS: Disposal, Industries, Construction, Waste Management, Water Pollution

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INTRODUCTION

Water, an indispensable resource for all life forms, exists in various forms, including rivers, glaciers, rainwater, and groundwater. A multitude of variables combine to make managing the freshwater supplies that are available and preventing their degradation an increasingly difficult task. These factors encompass the burgeoning global population, heightened water demand, climate change, deforestation, urbanization, pollution, geological and topographical variations, and soil characteristics (Dudgeon, 2000 (01)). Notably, anthropogenic influences emerge as the primary drivers disrupting water quality and the management of freshwater resources. Consequently, this exerts additional pressure on water service providers, particularly in developing nations, to ensure water quality and the sustainable management of freshwater sources. Unintentional results of human activity eventually end up in rivers, streams, and oceans as toxins via runoff and effluent discharge. Two major elements that have a direct impact on the availability of water sources for all living things are changes in land use and climate (Malmqvist & Rundle, 2002; Dudgeon, 2000 (01)).

Let us now turn our attention to Sri Lanka, which has 103 rivers in total. Of these, 29 flow straight into the sea, while the remaining 103 connect to major rivers, lagoons, salt marshes, or lakes (Katupotha & Gamage, 2020). Many of these rivers are still underutilized, but a small number are subject to strict regulations for hydropower production, irrigation, and household use (Eriyagama et al., 2015). Notably, there are serious pollution problems with the heavily used rivers that flow through highly inhabited and urbanized areas. Rivers including the Gin Ganga (Kumar et al., 2019), the Walawe River (Illeperuma, 2000), the Mahaweli River (Abeygunawardane et al., 2011; Bandara et al., 2011; Wickramasinghe et al., 2018), and the Malwathu Oya (Zoysa & Weerasinghe, 2016) all exhibit this problem. But the unenviable title of being Sri Lanka's most polluted river goes to the Kelani River (Ileperuma, 2000; Abeysinghe & Samarakoon, 2017; Kumar et al., 2019). With a length of 144 kilometers, the Kelani River is the fourth longest river in Sri Lanka and provides over 80% of the water used in Colombo (Kumar et al., 2019). The Sri Pada Mountain range is the source of the Kelani River, which flows through the hill country before emptying into the ocean near Colombo. The Kelani River performs a number of essential tasks in addition to providing drinkable water, including transportation, hydropower production, agriculture, fisheries, sewage disposal, and sand extraction. Furthermore, the river's aquatic biodiversity is extremely significant since it supports a wide range of common, threatened, endemic, and point endemic species (Narangoda, et al., 2023).

However, the Environmental Foundation Limited (EFL) has released a grave assessment designating the Kelani River as Sri Lanka's most contaminated and endangered watercourse. A number of sources contribute to pollution: runoff from agriculture, wastewater from homes and businesses, and discharges from more and more industry near the river (Dudgeon, 2000 (01)). Alarming trends indicate that the Kelani River's contamination is on an alarming upward trajectory due to the escalating release of pollutants into its waters. Consequently, there exists a looming threat that the river may reach a point where it can no longer serve as a reliable source of drinking water or safeguard the endemic aquatic species. This potential crisis assumes paramount importance given the Kelani River's pivotal role in supplying drinking water to people and conserving Sri Lanka's unique aquatic biodiversity (Dudgeon, 2000 (02)). Therefore, this study aims to comprehensively investigate the causes, ecological significance, and water management strategies essential for preserving the Kelani River. By doing so, we can ensure the provision of clean water for future generations and the conservation of Sri Lanka's endemic aquatic species.

RESEARCH PROBLEM

Recent years have seen a worrying reduction in the world's renewable water resources, which has been mostly linked to reasons such as pollution, deforestation, urbanization, climate change, increased water demand, and a growing global population (Gebeyehu, et al., 2018). Many aquatic ecosystems in both developed and developing countries have become contaminated as a result of this depletion. A significant fraction of the population in underdeveloped nations is frequently forced to use river basins and canals as their main sanitation systems due to a lack of sanitary facilities, which exacerbates the problem. Additionally, household and industrial waste finds its way into these water bodies, compounding the problem (Dybern, 1974). According to research by Sikder et al. (2013), dissolved metals, organic waste, and fecal contamination have a significant effect on rivers in impoverished nations.

One such critical waterway facing these challenges is the Kelani River in Sri Lanka, renowned for its significance as a primary river in the region. Nevertheless, the escalating demands of urbanization, driven by rapid population growth, have taken a toll on the water quality of this vital river. Many studies have connected river water quality degradation to point source pollution (direct discharges from land use categories that include residential, industrial, and agricultural operations) as well as non-point source pollution (urban stormwater runoff; Dudgeon, 2000 (01)). The situation is made much more difficult by the fact that the Kelani River

is home to numerous aquatic endemic species that are exclusive to Sri Lanka and provide the local population with a major source of drinking water. As a result, the current study problem relates to the pressing requirement for efficient conservation measures to manage the Kelani River's increasing pollution in Sri Lanka. The need to protect this priceless water resource, guarantee the availability of clean drinking water, and maintain Sri Lanka's rich aquatic biodiversity is highlighted by this problem.

RESEARCH OBJECTIVE

The Researcher aims to focus on water pollution in the Sri Lankan Kelani River Basin, with a specific focus on identifying and analyzing the causes of pollution, understanding the ecological significance of the river ecosystem, and proposing effective management strategies.

RESEARCH METHODOLOGY

The research primarily relies on secondary data collection methods. Relevant secondary data, such as research articles, journals, publications, annual reports, books, and official internet sources, have been gathered and analyzed. Additionally, to supplement the secondary data, references have been drawn from pertinent literature and research papers both nationally and internationally, all of which are relevant to the subject matter of this study. The collected secondary data underwent qualitative analysis, and the findings are presented descriptively in this study.

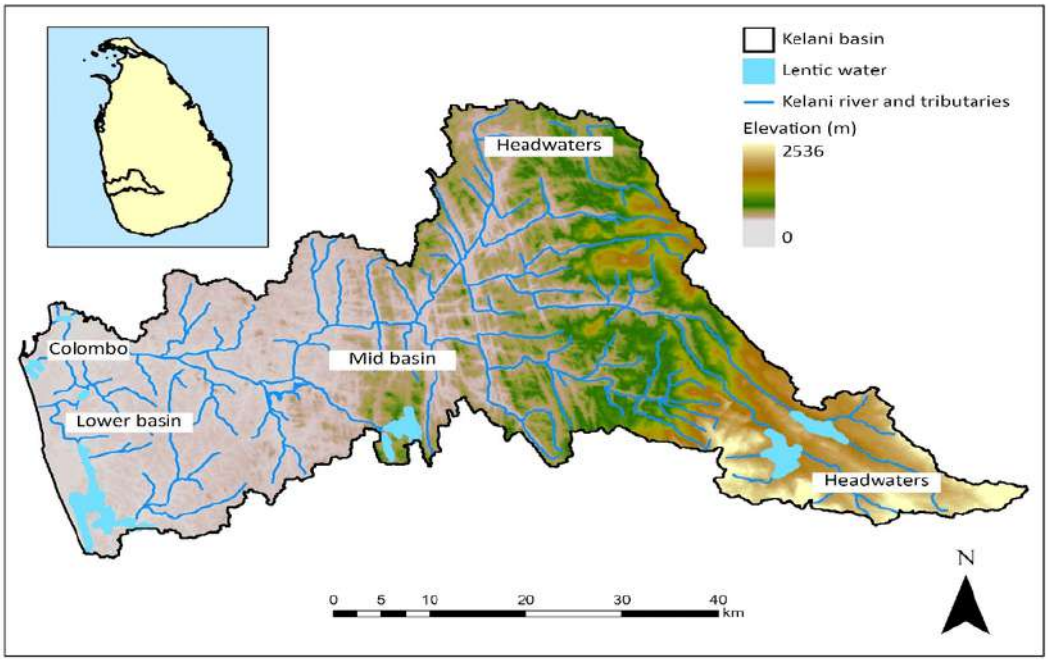
Study Area

The Kelani River basin spans 2230 km2 and is situated between the northern latitudes of 6° 47' to 7° 05' and the eastern longitudes of 79° 52' to 80° 13' (Mahagamage & Manage, 2018). Flowing through several districts, including Nuwara Eliya, Kandy, Ratnapura, Kegalle, Kalutara, Colombo, and Gampaha, it is one of Sri Lanka's longest rivers. This comprehensive coverage, which includes 37 Divisional Secretariat districts, demonstrates the river's important impact on a wide-ranging and diversified geographic area. Starting in the central hills of Sri Lanka, more precisely in the Nallatanniya region, this important river travels 144 kilometers to end up in the capital city of Colombo, which is the country's most important commercial metropolis (Narangoda, et al., 2023). To better understand catchment behavior, the entire Kelani River basin has been chosen as the study area for this research and separated into three regions (Figure 01). These areas comprise low-order top reaches with forested central highlands, mid-reaches with

low-moderate intensity development, and lower reaches with Colombo, Sri Lanka's capital (CEA, 1985).

Within Sri Lanka's hydrological landscape, the Kelani River assumes paramount significance as it caters to more than 80% of Colombo's water demand, underlining its vital role in sustaining urban life. Moreover, the Kelani River serves multiple essential purposes, including facilitating transportation, supporting irrigation, sustaining fisheries, and enabling hydropower generation. Its discharge exhibits notable seasonal variability, fluctuating from 800 to 1500 cubic meters per second during the monsoon seasons and decreasing to 20–25 cubic meters per second during dry periods. This dynamic flow regime hinges upon the operation of three strategically located reservoirs within the river's expansive catchment area (De Zoysa & Inoue, 2008).

Figure 1: Map of Kelani River Basin, Sri Lanka



Source: Surasinghe, et al., 2019

The whole mainstem, significant tributaries, and associated lentic systems of the Kelani River Basin in Sri Lanka are depicted in the above figure. The geographic expanse of the basin includes Colombo, the commercial hub of Sri Lanka. Moreover, the boundaries of the upper, lower, and midbasins are all distinct.

RESULTS AND DISCUSSION

1. Introduction to Kelani River

The Kelani River, which flows through the districts of Gampaha and Colombo in Sri Lanka, is an important river in an area with a significant concentration of industrial activity. Because so many people in the nation depend on the waters of the Kelani River for their daily needs, it is critical for water resource managers to comprehend the complex interplay between land use and surface water quality. The 144-kilometer-long Kelani River is extremely important economically to the people of Sri Lanka since it supports a wide range of residential, industrial, and agricultural activities. Encompassing two fast industrializing and heavily populated urban districts, Gampaha and Colombo, the river basin is the second largest in Sri Lanka and is located within its lower-middle part (Narangoda, et al., 2023). The Peak Wilderness Sanctuary and the western side of the central uplands in Horton Plains National Park are its source areas, and it drains a sizable region that is roughly 2,292 square kilometers in size. The flow dynamics of the river display significant seasonal fluctuations, with a range of 800 to 1500 cubic meters per second during the monsoon season and 20 to 25 cubic meters per second during the dry season. The latter is dependent on the state of operation of three reservoirs situated within its catchment region. Interestingly, between 600,000 and 800,000 cubic meters of sand are extracted from the river each year; this process is done solely by hand labor, albeit it does cause a steady 10-centimeter annual sinking of the riverbed (De Zoysa & Inoue, 2008).

The Kelani River plays a pivotal role in providing a spectrum of essential water resources, encompassing drinking water requirements, electricity generation, agricultural needs, industrial processes, household consumption, recreational activities, and other critical environmental utilities. Furthermore, it contributes significantly to the preservation of a robust ecosystem, renowned for hosting nationally important habitats that accommodate a diverse array of common, endangered, endemic, and point endemic species. Several major water intakes are strategically positioned along the Kelani River, serving locales such as Avissawella, Kosgama, Biyagama, Pugoda, and Ambatale. In the districts of Gampaha and Colombo, the National Water Supply and Drainage Board (NWSDB) uses the waters of the Kelani River to provide drinkable water to a sizable metropolitan population. The Kelani River's resources are also utilized by well-known businesses including American Waters, Pepsi, Coca-Cola beverages, and Ceylon Cold Stores PLC, all of which primarily rely on water as their principal production ingredient. But there's a serious environmental problem with the river's

increasing contamination, which is caused by industrial waste that is released during production (Dudgeon, 2000 (02)).

2. Causes of water pollution in Kelani River

The Kelani River, a pivotal freshwater resource in Sri Lanka, has recently grappled with a formidable environmental challenge in the form of pollution. The river, historically integral to local communities for drinking water supply, agricultural sustenance, industrial applications and habitat for aquatic endemic species, now confronts a complex and pressing issue - pollution (Surasinghe, et al., 2019). This multifaceted issue arises from a complex interplay of factors, stemming from both point and non-point sources of pollution. In this comprehensive analysis, we delve into the causes of water pollution in the Kelani River, categorizing them into point and non-point sources, to shed light on the challenges this vital Sri Lankan waterway faces.

Picture 1: Source CITATION Rod16 \l 1033 *(Rodrigo, 2016)*

Picture 2: Source CITATION Dai15 \l 1033 *(Daily Mirror, 2015)*

Picture 3: Source CITATION Col20 \l 1033 *(Page, 2020)*

Point - Sources

When examining the point sources of water pollution in the Kelani River basin, several key contributors come to the forefront. These include industries, waste disposal practices, hydrological changes and overexploitation. Let's delve into how each of these elements contributes to water pollution in the Kelani River basin,

I. Industrial Discharges

Industrial discharge, a ubiquitous facet of contemporary industrialization, poses a significant threat to water ecosystems worldwide. The release of effluents from industrial activities introduces a spectrum of pollutants into water bodies, with ramifications for both aquatic ecosystems and human well-being. The Kelani

River emerges as a critical focal point of water pollution stemming from industrial activities within its basin. Though widely acknowledged as one of Sri Lanka's most polluted rivers, the Kelani River serves as the main supply of water for Colombo, the country's commercial centre. Thus, it has been shown how sensitive the Kelani River basin is to the environment, from Glencorse (6.9643◦ N, 80.1877◦ E) to the river mouth (6.9787◦ N, 79.8700◦ E) (Narangoda, et al., 2023). This emphasis stems from the necessity of maintaining acceptable limits for the concentrations of water quality. The catchment area, which has been identified based on its environmental value, faces a contradiction because of the significant concentration of private and governmental industrial businesses, which are primarily located in Sri Lanka's Western Province (CEA, 2023). In addition to taking up a substantial chunk of the Kelani River basin, this industrial presence also makes a major contribution to the current problems with water pollution (Mallawatantri, et al., 2016). According to the Central Environmental Authority (CEA, 1992), the Kelani River basin hosts an extensive industrial presence, numbering over 9000 establishments categorized into three groups based on their pollution potential: Category A comprises highly polluting industries, Category B includes medium polluting industries, and Category C encompasses low polluting industries. Interestingly, 2600 industries are under Category A, 3500 are under Category B, and 3000 are under Category C. Over 6,000 enterprises in this vast industrial environment immediately release garbage into the river (Justice, 2015; Dissanayake & Rajapakse, 2019; Gunawardena, et al., 2017). According to Gunawardena et al. (2017), this combined discharge results in an estimated daily point-source discharge surpassing 414,600 cm3, which causes a significant biological oxygen demand above 11,600 kg daily.

Seethawaka and Biyagama are home to two sizable industrial zones with centralized waste treatment facilities (Picture 04). Furthermore, a significant number of industries line themselves along the river's path and spread outside these specified zones. Numerous enterprises discharge both treated and untreated industrial effluents into the waters of the Kelani River, which serves as the drainage basin for the most densely populated province in the nation. Interestingly, a number of major industries that produce wastewater are housed in the Biyagama Export Promotion Zone. These industries include those that produce raw rubber, rubber latex, textiles, food and beverage, steel, fertilizer, and other industrial operations (Mahagamage et al., 2014). Water quality measurements at the Thulduwa and Seethawaka ferry monitoring sites surpassed specified criteria (CEA, 2015). The parameters under scrutiny comprised of Chemical Oxygen Demand (COD) surpassing standards 37% of the

time, Biological Oxygen Demand (BOD) exceeding standards 13% of the time, Dissolved Oxygen levels falling below standards 43% of the time, and Heavy Metal concentrations surpassing standards 7% of the time. According to Mallawatantri et al. (2016), the Seethawaka ferry site's receipt of industrial effluent from the Seethawaka industrial zone is a significant contributing factor to the decline in water quality at these two locations over the previous three years.

II. Improper Waste disposal (Sewage waste and Solid waste)

One of the main point sources of water pollution, especially in the lower and mid-reaches of the Kelani River, is the inappropriate disposal of waste, which includes both solid waste and sewage waste. Water bodies can get contaminated as a result of the careless disposal of solid waste and sewage, which is a serious environmental risk. The Kelani River basin's overall ecological health and water quality are being negatively impacted by insufficient waste management techniques, which are exacerbating the problem. This has been a serious problem, with documented cases of uncontrolled trash disposal dating back to the 1980s, primarily in the busy city of Colombo (Peters, et al., 2016; Pompeu & Alves, 2005). Due to their discharge of untreated or inadequately treated sewage as well as household wastewater into the river, at least four major municipalities in the basin have been implicated in the problem (Illeperuma, 2000; Bandara, 2003). This method has caused an excessive build-up of organic waste, which has raised the Biological Oxygen Demand (BOD) considerably (Vaughn, 2005). At least four significant municipalities in the basin have been shown to be involved in the issue, as they release residential wastewater and untreated or partially treated sewage into the river (Illeperuma, 2000; Bandara, 2003). Due to this technique, organic waste has accumulated excessively, significantly increasing the Biological Oxygen Demand (BOD) (Vaughn, 2005).

An essential element of this problem is urban runoff, which exacerbates the dynamics of water contamination. Numerous contaminants that are physiologically dangerous are present in the discharge, such as oils, hydrocarbons, heavy and trace metals, and more. The gravity of this concern is well-documented, both in contemporary (2007) and historical (1985) contexts (Gunawardena, et al., 2017). Consequently, a slew of adverse water quality parameters has been recorded at various junctures along the Kelani River. The residential and industrial areas of the Kelani River have been found to have significantly higher conductivity (between 0.006 and 0.009 Sm−1), chemical oxygen demand (11.8 to 19.4 mg L−1), biological oxygen demand (between 1.7 and 2.9 mg L−1), and total coliform bacteria (between 30,600 and 51,000 cells

per 100 mL). Furthermore, it is concerning that some urban areas do not meet the necessary standards for the quality of their drinking water (Herath & Amaresekera, 2006). This confluence of issues underscores the pressing need for effective remediation strategies and stringent regulations to address waste disposal concerns, a critical imperative in safeguarding the water quality and ecological integrity of the Kelani River.

III. Hydrological Changes and Overexploitation

The Kelani River, a lifeline in Sri Lanka, confronts a multifaceted array of challenges rooted in hydrological changes and overexploitation, which collectively cast a significant shadow on its water quality and ecosystem health. These intertwined factors, although interconnected, exert distinct pressures on this vital waterway.

Hydrological Changes:

One salient facet of hydrological change in the Kelani River basin centers around the establishment and operation of hydropower infrastructure. The harnessing of the river's flow to generate electricity has led to profound modifications in its natural flow regime, ushering in a series of far-reaching consequences. The controlled release of water for power generation disrupts the river's innate flow patterns. This disruption, particularly when water is released during peak electricity demand, creates disharmony with the river's natural rhythms. The ramifications of such flow modification are particularly pronounced during periods of low flow, affecting downstream ecosystems. Moreover, hydropower installations, such as dams and reservoirs, have the capacity to trap sediment, curtailing the downstream transport of sediments (Zubair, 2003). This sediment deprivation significantly alters the river's geomorphological characteristics and impacts the habitats of aquatic organisms reliant on sediment deposition. Additionally, the release of cold water from deep reservoirs by hydropower plants can significantly lower downstream water temperatures, posing challenges for aquatic organisms adapted to specific temperature ranges.

Overexploitation: Simultaneously, overexploitation of the Kelani River's resources adds to the complexity of the challenges. This overutilization encompasses various dimensions, and one of the most striking facets is witnessed in the domain of fisheries. Excessive fishing pressure, including illegal and unsustainable practices, has resulted in the depletion of fish populations within the river. This depletion cascades through the river's food web, impacting local livelihoods that depend on fishing activities. Moreover, the loss of certain

fish species reverberates through the ecosystem, affecting nutrient cycling dynamics.

Hydrological Changes and Overexploitation in Detail:

Going beyond the broad overview, it's imperative to scrutinize the nuanced aspects of these challenges in the Kelani River basin. The construction of five major hydropower reservoirs since 1950 and the establishment of 32 mini-hydropower plants since 2000 have collectively imposed impediments on the river's natural flow. Additionally, flood levees and dikes have been instrumental in further modifying the river's discharge patterns (Zubair, 2003; Silva. et al., 2005). These blockages to flow ultimately result in changes to flood pulses, conductivity, dissolved oxygen, and alkalinity in the water, as well as changes to discharge regimes. The alterations have an effect on the habitat structure of the river, affecting not only the river channel but also the nearby floodplains (Abeysinghe & Samarakoon, 2017). In some tributaries of the Kelani River, a startling 60% of the tributary length has been converted into low-flow or dead zones behind mini-hydropower dams. Because of these impoundments, almost 30% of the total course of the Kelani River is compromised. According to Silva et al. (2005), the effects of these impoundments range from the disruption of the flow of sediment and organic matter to areas downstream to the conversion of lotic systems upstream of dams into lentic systems. The natural balance of the river is further upset by the fact that fish and macroinvertebrates find it harder to spawn in reservoirs created by hydroelectric projects. Changes in the structure of fish communities, such as the tailwater areas' shift from cyprinids to cichlids, highlight the extensive consequences of hydrological changes (Silva, et al., 2005).

Non - Point sources

Indeed, alongside the point sources of water pollution in the Kelani River basin, several non-point sources significantly contribute to the pollution of this vital waterway. Let's take a brief look at these sources and how they contribute to pollution in the Kelani River basin.

I. Population rising

The escalating population within the Kelani River basin represents a notable demographic factor contributing to various environmental challenges, including those related to water resources. The steady increase in human inhabitants exerts pressure on the basin's ecosystems and associated water bodies, engendering intensified anthropogenic activities and heightened demand for

water resources. This population rise introduces complexities in resource management, necessitating a nuanced understanding of its implications on water quality, availability, and overall ecological equilibrium within the Kelani River basin. The escalation of population within the Kelani River basin emerges as a pivotal contributor to the escalating water pollution predicament. Approximately 25% of the nation's total population is concentrated within this basin, with the highest population density observed in the latter reaches encompassing the densely populated districts of Colombo and Gampaha (Mahagamage & Manage, 2015). The nexus between population density and pollution extent is conspicuous across the watershed. The integrated pollution index in the lower basin, home to over 6 million people that is, more people per square kilometer than in any other area consistently fails to meet water-quality criteria set for drinking water, recreational use, and the preservation of aquatic biodiversity (Liyanage & Yamada, 2017). The burgeoning population in this region significantly exacerbates various forms of water pollution. The absence of adequate sanitation facilities for local communities compounds the problem. Moreover, the extensive use of agrochemicals in agricultural practices, characterized by the improper application of fertilizers and pesticides, further exacerbates pollution concerns. Ineffective solid waste management practices, coupled with inadequately treated wastewater discharges, pose additional risks to the integrity of water sources (CEA, 1992).

Specifically, Chandrathilake and Silva (2011) have established that the head region's tea plantations are vulnerable to dangers related to improper use of agrochemicals and poor sanitation. Moreover, Madduma Bandara et al. (1987) have compiled a list of the environmental issues in the lower basin, where high population densities, including the growth of illegal colonies inside Colombo city, are linked to the expansion of shanty towns along canal banks. Given these considerations, human density becomes apparent as a potent cause of water contamination in the Kelani River watershed.

II. Urbanization

Urbanization represents a formidable force shaping the environmental landscape of the Kelani River basin. This basin encompasses metropolitan Colombo, the largest city in Sri Lanka, boasting a population of approximately 6.6 million residents and an astonishing population density of 134,680 individuals per square kilometer. This urban sprawl presents a complex interplay of challenges for the river ecosystem due to its remarkable coverage of impervious surfaces, which account for nearly 40% of the urban built-up land cover (Senanayake & Moyle,

1982). Urbanization exerts a multifaceted influence on water pollution within the Kelani River basin, predominantly driven by heightened anthropogenic activities associated with urban development (Picture 02). The surge in population density, a hallmark of urbanization, precipitates an increase in waste generation. Notably, the escalation in household waste and solid waste production becomes pronounced, with subsequent disposal practices contributing significantly to water pollution. The indiscriminate release of such waste into water bodies compounds the environmental challenges faced by the Kelani River basin. Furthermore, the surge in human waste, particularly from drainage systems, intensifies during rainy periods, further contaminating water bodies. Pollutant loads into the Kelani River are increased by the combination of urban rainwater runoff and raw sewage. This dynamic interaction between urbanization and water pollution necessitates a comprehensive understanding of the pathways through which urban-generated waste degrades water quality. The proliferation of factories in urban zones also plays a pivotal role in water pollution within the Kelani River basin. Industrial activities contribute diverse pollutants to water bodies, including chemicals, heavy metals, and effluents. In urban areas adjacent to the Kelani River, the cumulative impact of numerous factories discharging waste directly into the water exacerbates the pollution challenge. The contamination stemming from industrial discharges further underscores the intricate relationship between urbanization and water quality degradation. Moreover, urban centers often host healthcare facilities, generating a substantial volume of medical waste. Improper disposal practices within these urban areas lead to the infusion of hazardous substances into the Kelani River, posing additional threats to water quality.

The ramifications of Colombo's urban growth are felt throughout the basin, leading to significant changes in the land cover. Between 1989 and 2016, there was a notable 25% increase in the built-up area of the Colombo metropolis. The biological equilibrium of the Kelani River and its environs is significantly impacted by these changes in land use (Dearman, et al., 2013). A notable feature within the Kelani basin is the prevalence of homesteads, collectively occupying a quarter of the basin's area. In closer proximity to the river mouth, the floodplain is marked by the presence of shanties and slums. These human settlements, while reflecting the region's demographic dynamics, bring their own set of challenges to the forefront (Management., 2018). The amalgamation of urbanization and its concomitant land-use alterations not only shapes the physical landscape but also engenders a confluence of environmental threats. The vulnerability of the Kelani River to multifaceted risks is heightened as urban expansion continues (Surasinghe, et al., 2019). Mitigating the adverse impacts of urbanization on water

quality and ecosystem health necessitates the implementation of comprehensive strategies rooted in sustainable urban planning and environmental management practices.

III. Wetland Degradation

The issue of wetland degradation occupies a prominent position among the complex array of factors contributing to the escalating pollution challenges faced by the Kelani River. Wetlands, characterized by their distinctive hydrological dynamics and rich biodiversity, hold significant roles in the regulation of water quality, flood mitigation, and providing a wide variety of aquatic and avian species with habitat (Semlitsch & Semlitsch, 2013). Within the context of the Kelani River basin, historical transformations to the landscape have induced substantial alterations in wetland ecosystems. Over time, many of these once-thriving wetlands have succumbed to drainage, filling, or dredging, primarily to accommodate burgeoning urban expansion and intensified agricultural practices (Semlitsch & Semlitsch, 2013). The loss of wetlands in the Kelani River basin, particularly in the Colombo Metropolitan area, has been significant over the past fifty years due to urbanization and agricultural expansion. These wetlands, once a mosaic on the Kelani floodplain, have been filled, dredged, or drained, leading to a 52% decline in freshwater habitats. Urban expansion in Colombo has surged by 25% from 1989 to 2016, exacerbating the challenges faced by wetlands (Derana, 2022). A comprehensive analysis indicates that around 63% of the wetlands in the Colombo Metropolitan Region have been adversely impacted. This highlights the complex interplay between urbanization, environmental changes, and hydrological dynamics.

IV. Deforestation

In the Kelani River basin, deforestation is a major cause of water contamination with far-reaching ecological effects. Urbanization and infrastructural development in the lower basin, as well as activities related to agriculture in the upper and mid-basins, have been the main drivers of this phenomenon (Mallawatantri, et al., 2016). Because of the Kelani basin's distinct vegetation and forest cover, the effects of deforestation are especially noticeable. Urbanization and infrastructural development have been identified as the main drivers of deforestation in the Kelani River basin, with the lower basin being more affected. Concurrently, there has been a notable decline in the amount of forest cover in the upper and mid-basins due to agricultural operations. The riparian vegetation found on the outskirts of Colombo is characterized by a restricted diversity of vegetation, primarily consisting of short grasses, bushes, and scrub (Department of Census

and Statistics, 1994). This is noteworthy. Today, only a mere 10% of the Kelani basin retains its forest cover, with much of the forest loss occurring in the post-colonial period (Dammalage & Jayasinghe, 2019). The remaining forest areas are mostly sub-montane and montane moist evergreen forests, and they are mainly located in the upper basin (Management, 2018). In order to lessen the negative effects of deforestation on water quality and the general health of the Kelani River, it is imperative that these special ecosystems be preserved and restored. This is demonstrated by the disproportionate distribution of wooded areas.

3. Ecological significance of Kelani River

Comprehensive biodiversity surveys within the Kelani River Basin, focused on systematic documentation, remain notably absent. Nonetheless, sporadic studies carried out by scientists to fulfill different goals have gradually helped to build an ecological significance profile for the Kelani River Basin. It is essential to recognize that the information presented herein is contingent upon a limited dataset. Consequently, the ecological significance of the Kelani River Basin might surpass the reported findings. Previous surveys indicate the presence of point endemism, endemism, and threatened species of fauna and flora within the Kelani Basin. The Kelani River basin contains a wide variety of inland and coastal wetlands in addition to a range of nationally significant habitats, such as mountain springs, ephemeral headwater streams, and huge permanent rivers. The northern wet lowlands, the foothills of Adam's Peak and Ambagamuwa, and the Adam Peak highlands are the three main floristic zones that are covered by this amazing diversity. According to Jayasuriya et al. (2016), the river passes through three different forest communities in these areas: tropical wet evergreens, tropical moist upper montane forests, and tropical submontane evergreens. Balanocarpus kitulgalensis, an indigenous species found only in the riparian woods of the Kelani basin, is one of the basin's most notable and severely endangered species (Mallawatantri, et al., 2016). The unique plant Vetica luwesiana and the fish species Pethia bandula and Systomus asoka are among the other ecologically noteworthy species present in the ecosystems of the Kelani River (Perera, 2018)

Picture 4: Pethia bandula Source: CITATION Bio14 \l 1033 *(Biodiversity, 2014)*

Picture 5: Systomus asoka CITATION Sri16 \l 1033 *(Sri Lanka , 2016)*

Table 01: The Kelani River Basin's list of vulnerable species (*IUCN, 2013*)

Species	Total Number	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)
Dragonflies	16	8	7	1
Butterflies	23	1	10	12
Freshwater Fish	27	8	15	4
Amphibians	9	0	6	3
Reptiles	11	1	6	5
Birds	25	0	10	15
Mammals	28	1	14	13

Source: Mallawatantri, et al., 2016

Table 01 gives a summary of the IUCN's National Red List's vulnerable species in the Kelani River basin as well as information on their state of conservation. This basin is home to a wide variety of wildlife, including amphibians, reptiles, birds, butterflies, dragonflies, and freshwater fish. Notably, three freshwater crabs species, Ceylonthelphusa nata, Clinothelphusa kakoota, and Perbrinckia cracens, as well as many species of damselfly, such as Archibasis oscillans, are listed on the IUCN's National Red List (Perera, 2018). Although freshwater fish in the Kelani River basin are particularly important, contamination poses serious threats to them. The majority of Sri Lanka's indigenous freshwater fish species are found in the southwestern ichthyological province, which includes this basin (Senanayake & Moyle, 1982). Thirty of the sixty freshwater fish species found in

the Kelani basin are indigenous, according to a thorough assessment of the literature. This varied fish community, which represents 27 different families, makes up 63% of Sri Lanka's freshwater fish variety. Remarkably, according to the Environment (2012), 24 of these fish species are threatened, with 8 being classified as critically endangered, 15 as endangered, and 4 as vulnerable.

Two of the freshwater fish in the Kelani River basin are microendemics: Systomus asoka (Asoka barb) (Picture 06) and Pethia bandula (Bandula barb) (Picture 05), both of which have a very limited range (Surasinghe, et al., 2019). The former can only be found in a restricted area near a single tributary (at Galapitamada, Kegalle District) in the middle of the basin, whereas the latter have been found in several foothill tributaries of the Kelani River (Kithulgala and Deraniyagala, Kegalle District). Fish species including Garra ceylonensis (Ceylon stonesucker), Systomus pleurotaenia (Black lined barb), and Schistura notostigma (Banded mountain loach), are specialized for highly-oxygenated, swiftly flowing cold waters which are at risk due to hydrological alterations and pollution. Furthermore, species like Pethia nigrofasciata (Black ruby barb), which require streams with canopy cover, may be impacted by habitat loss, especially in riparian forests. Fish kills in the lower reaches have occasionally been documented as a result of home and industrial garbage discharge (Herath & Amaresekera, 2006). At least 25 alien freshwater fish species have been established in Sri Lanka, therefore, the Kelani River basin is not immune to their presence. The biodiversity of native freshwater ecosystems is impacted by these invasive species. Particularly, the basin's residential and urban areas are home to a variety of alien fish species, such as Helostoma temminkii (Kissing gourami), Oreochromis mossambicus (Mozambique Tilapia), O. niloticus (Nile Tilapia), Trichopodus pectoralis (Snakeskin gourami), and Pterygoplichthys cf. disjunctivus (Vermiculated Sailfin Catfish) (Pethiyagoda, 1994).

On top of that, the formerly common Macrognathus pentophthalmos, or Lesser Spiny Eel, is now extremely rare in Sri Lanka, especially in the lowland floodplains of the Kelani River basin. This species' current rarity is probably due to historical reasons, such as the presence of contaminants and invading predatory species. Due to their increased capacity to retain sediment, accumulate organic matter, decrease water clarity, lower dissolved oxygen levels, and increase evaporation rates, invasive aquatic plants like the water hyacinth (Eichhornia crassipes) have made ecological problems worse (Silva et al., 2015). Significant alterations in habitat structure and wetland hydroperiod have resulted from the widespread invasion of alien aquatic plants by numerous urban wetlands in the Kelani River watershed, particularly those in metropolitan Colombo (Marambe, et al., 2001). It

is imperative to acknowledge that the elevated level of pollution within the Kelani River watershed presents a significant threat to biodiversity. While some species may have already suffered extinction, others may yet be uncovered. Because of this, it is crucial to take the appropriate safety measures to preserve and safeguard biodiversity, both known and unknown, in the face of rising pollution levels.

DISCUSSION AND CONCLUSION

Upon examining the noteworthy findings of this study, it becomes evident that the Kelani River, a crucial freshwater resource in Sri Lanka, is grappling with an alarming level of pollution attributed to a complex interplay of both point and non-point sources.

Specifically focusing on point source pollution, industrial discharges emerge as a significant contributor. The basin hosts over 6,000 industries, releasing an estimated daily point-source discharge exceeding 414,600 cm3. A significant biological oxygen requirement that surpasses 11,600 kg daily is the consequence of this. The presence of extensive industrial zones, such as Seethawaka and Biyagama, coupled with inadequate waste management, exacerbates the pollution burden. Improper waste disposal, including sewage and solid waste, is another significant concern, especially in urban areas, leading to elevated levels of contaminants in the river. And also, hydrological changes in the Kelani River basin, primarily driven by hydropower infrastructure and overexploitation, further compound the challenges. The natural flow regime of the river has been significantly altered as a result of the building of five large hydropower reservoirs since 1950 and the installation of 32 mini-hydropower plants since 2000. Because of this disturbance and overexploitation, a startling 60% of the tributary length below mini-hydropower dams has become low-flow or dead zones, which has an effect on downstream ecosystems. Overfishing pressure, including illicit and unsustainable fishing methods, has negatively impacted the river's fisheries and reduced fish populations.

The Kelani River basin deals with a complex web of issues related to non-point causes of water pollution, including as urbanization, population growth, deforestation, wetland degradation, and cattle farming. With approximately 25% of Sri Lanka's total population concentrated in the basin, particularly in densely populated districts like Colombo and Gampaha, the escalating anthropogenic activities significantly contribute to pollution. The population density, exceeding 2500 individuals per square kilometer in the lower basin, exacerbates various forms of water pollution due to inadequate sanitation, agrochemical misuse in

agriculture, and inefficient waste management practices. Urbanization, particularly in Colombo, the largest city in Sri Lanka, with a population of around 6.6 million and a density of 134,680 individuals per square kilometer, presents a multifaceted challenge. The expansive urban sprawl covers nearly 40% of impervious surfaces, leading to increased waste generation. In the Kelani River watershed, the combined effects of untreated sewage, inappropriate waste management, and industrial discharges severely deteriorate the water quality (Senanayake & Moyle, 1982; Dearman, et al., 2013).

Wetland degradation is another pressing issue within the basin, with historical transformations for urban and agricultural development leading to a significant reduction in wetland ecosystems. The adverse impacts are evident in the decline of floodplain wetlands and freshwater marshes. Over the last five decades, approximately 63% of the wetlands in the Colombo Metropolitan Region have been adversely impacted, emphasizing the intricate relationship between urbanization, environmental transformations, and hydrological dynamics (Semlitsch & Semlitsch, 2013; Derena, 2022). And deforestation, stands out as a major contributor to water pollution, being mostly driven by urbanization in the lower basin and agricultural activity in the upper and mid-basins. Today, only 10% of the Kelani basin is covered in forest, and the region's distinctive vegetation highlights the negative ecological effects of deforestation. The moist evergreen forests of the upper basin are sub-montane and montane, and they are essential to preserving the water quality and general health of the Kelani River (Mallawatantri, et al., 2016; Dammalage & Jayasinghe, 2019).

The basin's ecological significance is profound, featuring diverse habitats from mountain springs to wetlands across distinct floristic regions. Home to numerous endangered and endemic species, including critically endangered Balanocarpus kitulgalensis and unique species like Vetica luwesiana, the riparian forests are crucial. The basin's freshwater fish ecosystem, comprising 60 species (30 endemics), constitutes over half of Sri Lanka's endemic freshwater fish diversity. However, pollution, habitat changes, and invasive species threaten these species. Altered hydrology, industrial and residential pollution, and habitat loss, particularly in riparian forests, pose challenges to native fish species. Invasive aquatic plants, like water hyacinth, further disrupt ecosystems by altering habitats and degrading water quality.

In light of these formidable challenges, it is imperative to enact comprehensive conservation measures. These measures should encompass rigorous regulations, sustainable land-use practices, and effective waste management.

Protecting and restoring critical ecosystems assumes paramount importance. Additionally, fostering community awareness and engagement is indispensable for safeguarding this invaluable resource. The ecological integrity of the Kelani River must be preserved, and its ongoing benefits to the environment and its people depend on addressing both point and non-point causes of pollution.

Strategies for Mitigating Water Pollution in the Kelani River Basin

The depletion of water resources and the degradation of water availability and quality are the main causes of problems with water pollution. To solve challenges relating to water, the Sri Lankan government has launched a number of programs. That being said, Colombo is the only city in Sri Lanka with a working sewage system at the moment. The started efforts are displayed in Table 02. Additionally, the nation has improved septic systems and sewage disposal techniques, increased public awareness of the environmental harm caused by Kelani River pollution through workshops and training programs, authorized the Ministry of Environment to monitor and license industries along the river's banks, and strengthened river monitoring by expanding the number of sampling sites and automating the monitoring process (Narangoda, et al., 2023).

Table 02: Sri Lankan environmental laws pertaining to the preservation and administration of the Kelani River basin.

Name of Statute	Concerns Regarding Inland Aquatic Resources	Using the Agency	Year of the Last Amendment's Enactment
Comprehensive Environmental Laws			
National environmental Act	provisions for monitoring, protecting, and managing the environment. projects are approved by supervising environmental impact assessment techniques.	Central Environmental Authority	1980 (2000)

National Environmental Policy and Strategies	Gives guidelines for managing and conserving the environment in all its forms, especially with relation to sustainable agriculture. This includes fisheries, forestry, wildlife conservation, and other aquatic resources.	Ministry of Mahaweli Development and Environment	2003
Cleaner Product Policy	Reduce waste and overuse in order to increase the efficiency of your water and energy usage.	Ministry of Mahaweli Development and Environment	2005
National Forest Policy Forest Conservation Ordinance Amendment Act	Save woods for their aesthetic, historical, cultural, religious, and biological benefits. They also provide soils and water. Boost forest productivity and tree cover. amplify sustainable forestry's impact on the country's economy and rural development.	Forest Conservation Department	1995 1907 (2009)
National Wildlife Policy Fauna and Flora Protection Ordinance Amendment Act	Prevent overuse by protecting water biodiversity and habitats. Preserve genetic variety and ecological processes. Mark out conservation areas, taking into account embedded aquatic	Department of Wildlife Conservation	2000 1937 (2009)

	systems. Involve the neighborhood in the administration of protected areas.		
	Statues at the Watershed or Basin Scale		
National Watershed Management Policy	Watersheds should be preserved, restored, and managed while keeping an eye on their vital environmental dynamics.	Ministry of Mahaweli Development and Environment	2004
National Land-use Policy National Policy on Protection and Conservation of Water Sources, their Catchments and Reservations in Sri Lanka.	Create land-use regulations at the watershed level. All water sources should be preserved and restored, with watersheds being an exception. Encourage responsible governmental organizations and communities to manage their water resources in a way that promotes sustainable usage. Determine which regulations need to be changed. Address the shortcomings of current policies and encourage the management of inland aquatic resources throughout the watershed.	Ministry of Land and Land Development	2007 2014

Source: Developed by the Author

1. **Stringent Regulatory Framework**

- Environmental Impact Assessments (EIA): Mandate the conduct of EIAs for all proposed industrial and infrastructure projects within the basin to evaluate potential pollution risks comprehensively (Surasinghe, et al., 2019).
- Regular Audits and Inspections: Institute routine audits and inspections of industrial facilities to verify compliance with water quality regulations and standards.

2. **Sustainable Land-Use Practices**

- Precision Agriculture: Encourage precision agriculture techniques, including the use of GPS-guided machinery and remote sensing, to optimize resource utilization and reduce chemical inputs.
- Crop Rotation and Cover Crops: Promote crop rotation and cover cropping as practices that not only reduce pollution but also enhance soil health.
- Addressing pollution in the Yamuna River necessitates improved agricultural practices. The indiscriminate use of chemical fertilizers, insecticides, and pesticides has been a significant contributor to the issue. To mitigate these effects, adopting organic or biological farming methods is crucial. This involves prohibiting the use of harmful chemicals in the river basin. Awareness campaigns for farmers, facilitated through programs like the Kisaan Call Centre, provide scientific guidance on agriculture practices, emphasizing reduced chemical usage. Promoting bio-fertilizers, which contain fewer chemical constituents, is essential. Additionally, efforts to curb soil erosion in the river catchment area, achieved through measures like developing greenways along the drains, contribute to overall river conservation. (Sharma & Kansal, 2011).

3. **Effective Waste Management**

- Hazardous Waste Identification: Develop a comprehensive hazardous waste classification system to ensure the safe disposal of toxic substances.
- Public-Private Partnerships: Establish partnerships with private sector entities to facilitate the construction and operation of advanced waste treatment facilities.
- Addressing the pollution in the Yamuna River requires a comprehensive strategy for proper sewage management. Current challenges stem from untreated or partially treated sewage discharges. To combat this, a total

ban on such discharges and robust legislation are essential. Both building new, larger-capacity facilities and expanding the capacity of currently operating sewage treatment plants are part of the strategy. Using cutting-edge technologies is also essential to bringing biochemical oxygen demand (BOD) levels below 10 mg/L. Delhi's water authorities have initiated a forward-looking master sewage plan for 2031, encompassing sewered and unsewered areas, to effectively manage wastewater in the National Capital Territory. This multifaceted approach aims to protect the Yamuna River ecosystem from the adverse impacts of untreated sewage (Sharma & Kansal, 2011).

4. **Urban Planning and Management**

- Permeable pavements and green roofs: To reduce pollution and surface runoff, mandate the inclusion of permeable pavements and green roofs in urban development plans.
- Green Certification: Introduce a green certification program for urban developments, offering incentives for sustainable designs.

5. **Community Engagement and Education**

- Citizen Science Programs: Establish citizen science programs to involve local communities in water quality monitoring and data collection (Narangoda, et al., 2023).
- Public Workshops: Organize workshops and seminars to educate residents on the importance of pollution prevention and sustainable water management practices.

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The Relationship between Personality Traits, Emotional Intelligence, and Covid-19 Severity: A Cross-Sectional Study

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ABSTRACT

The Coronavirus Disease-19 (COVID-19) pandemic affected the entire world during the last few years, creating long-term social and economic problems in the aftermath. The current study investigated how long-term psychological variables, such as personality, trait emotional intelligence, and other socio-demographic factors were related to the severity of the COVID-19 infection. The objective was to explore if there were significant correlations between personality traits and emotional competence (commonly referred to as emotional intelligence) and the severity of the COVID-19 disease and post-COVID adjustment in a group of patients who had suffered from COVID-19. A stratified random sample of 52 patients followed up by the post-COVID clinic of the University Hospital of the General Sir John Kotelawala Defence University (UHKDU) participated in the study. Their personality was measured using an adapted Sinhala version of the Big Five Inventory (BFI), and their trait emotional intelligence was measured by an adapted Sinhala version of the Trait Emotional Intelligence Questionnaire-Short Form (TEIQUE-SF). Socio-demographic variables were also recorded. The results of this study show that personality traits or traits of emotional intelligence were not significantly related to the severity of the COVID-19 infection. Out of the measured socio-demographic variables, employment status was observed to be the only variable to have an association with the severity of COVID-19. According to the findings of the current study, it was concluded that most psychiatric symptoms reported in post-COVID syndrome are more likely to be related to the infection than to the premorbid personality or other long-term psychological variables. Short-term stress due to unemployment appears to predispose individuals to more severe forms of COVID-19.

KEYWORDS: Severity, Post-Covid Syndrome, Personality, Emotional Intelligence

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INTRODUCTION

Impact of COVID-19

The Coronavirus Disease-19 (COVID-19) pandemic affected the entire world. In this context, the global village concept of development and other technological advances such as fast transport options that connected human beings all over the globe were also proven to be risk factors. In fact, the pandemic showed that unless the entire world is safe, not a single place in the world will be safe from viral outbreaks. Thus, from the beginning itself, researchers and scientists working on managing and studying various aspects of SARS-CoV-2 have shared their knowledge and other scientific developments on global platforms, enabling each other to benefit from the increasing accumulation of knowledge (H H S Tech group, 2024).

At the time the research was carried out, the global rates of death due to COVID-19 were declining, and this trend was observed since August 2021. As of June 2024, there have been 775,522,404 confirmed cases of COVID-19 and 7,049,617 deaths (World Health Organization, 2024). In Southeast Asia alone, there were 61,289,673 confirmed cases (World Health Organization, 2024). While in Sri Lanka, there have been 672,763 confirmed cases of COVID-19, with 16,901 deaths (World Health Organization, 2024).

Physiological factors that affect COVID-19 disease severity

Despite the staggering number of COVID-19 infections, one crucial area of research focuses on the factors that influence disease severity. The progression of COVID-19 into severe cases served as a predictor for higher mortality rates during the pandemic. Among the currently identified risk factors for progressing into severe COVID-19 are increased age and comorbidities such as obesity, asthma, cardiovascular disease, diabetes, liver disease, and dementia. These factors have also been identified as risk factors for developing severe COVID-19 in young adults (Yek, 2022). Among other risk factors are male sex, advancing age (>45 years vs. younger), black race or ethnicity, homelessness and low income, and a sedentary lifestyle, which is associated with higher serum prostaglandin E2 levels (Ricke-Hoch et al., 2021).

Most studies have concentrated on the physical risk factors for severe COVID-19. Understanding these factors is crucial for reducing the mortality rate from the disease.

Psychological aspects and COVID-19

In addition to physiological factors, psychological aspects of a person are also important in coping with any disease and its subsequent outcomes. This is a well-established tenet in health psychology. The field of health psychology focuses on studying and addressing psychological factors that impact physical health, merging important psychological aspects that may have significant implications for COVID-19 outcomes.

Research has identified COVID-19 Stress Syndrome (CSS), which includes xenophobic fears (the fear that COVID-19 is spread by foreigners), COVID-19-related traumatic stress symptoms such as nightmares, and compulsive checking and reassurance seeking (Taylor, Fong and Asmundson, 2021). Studies have observed that personality traits may be important for COVID-19 outcomes (Rettew et al., 2021), while some studies have shown that emotional intelligence may be a stronger factor compared to personality in determining mental health outcomes in relation to COVID-19 (Prentice, Zeidan and Wang, 2020).

Emerging research has identified a range of post-COVID symptoms, commonly referred to as post-COVID syndrome due to the lack of standardized terminology. These symptoms, which can persist for many months after the initial infection, often include psychological aspects such as anxiety, depression, and cognitive impairments. Understanding both the subjective and objective nature of these symptoms is crucial for addressing the mental health challenges faced by COVID-19 survivors (Española De Quimioterapia et al., 2021).

Rationale

Given the current research suggesting that psychological factors play a crucial role in overall health and particularly in COVID-19, the researchers investigated whether significant correlations exist between personality traits and emotional intelligence with the severity of COVID-19 in patients who have experienced the disease.

Knowledge of such correlations can be used in designing holistic interventions for COVID-19 patients. Further, such knowledge can be used in health psychology to design holistic care for similar health conditions. In addition, the study can provide insights into which personal and emotional factors may predispose individuals to severe impacts from COVID-19 and may be important in preventive psychological measures.

Objectives

The primary objective of this study was to describe the relationship between personality and emotional factors in the severity level of COVID-19. The specific objectives were to describe the associations between COVID-19 severity, personality traits, and trait emotional intelligence. Additionally, this study examined the relationship between COVID-19 severity and various factors, including personality traits, emotional intelligence, and other demographic characteristics of the patients.

METHODOLOGY

A retrospective cross-sectional study was conducted at the University Hospital of General Sir John Kotelawala Defence University (UHKDU). Fifty-two (52) patients followed up by the post-COVID clinic of UHKDU were recruited for the study. All participants were over 18 years of age and in remission from the active stages of COVID-19. Patients who tested positive for COVID-19 at the time of the interview were excluded.

The Ethics Review Committee (ERC) of the Faculty of Medicine, General Sir John Kotelawala Defence University (KDU) provided ethical clearance for this study (RP/2022/10).

Sampling method

A stratified random sample out of 120 patients who were followed up by the post-COVID-19 clinic of UHKDU participated in the study. A method of proportional allocation was used to determine the sample size. The population was divided into five strata based on their COVID-19 disease severity. Each of these strata was further divided into two strata based on their gender proportions. The below-mentioned stratified random sampling formula was used to calculate the sample size.

Sample size of the strata = (Size of the entire sample / Population size) × Stratum size has been used to calculate the sample size of each stratum (Etikan, 2021).

Stratified random sampling was employed to account for the variation in outcomes among patients infected with COVID-19. This method involves dividing the population into distinct subgroups, or strata, based on specific characteristics such as disease severity or gender. By ensuring that each stratum is adequately represented in the sample, stratified sampling helps to control for variations within these subgroups. This approach is expected to provide more accurate and

reliable data, as it allows for a more precise analysis of the different levels of disease outcomes among the patients (Shannon et al., 2018).

Study instruments and variables

Measures of personality and emotional intelligence

TEIQue- SF

Trait Emotional intelligence was enumerated as a score yielded by the Trait Emotional Intelligence Questionnaire Short Form (TEIQue-SF). This is a 30-item, self-report questionnaire designed to measure the trait of emotional intelligence (Psychometriclab.com, n.d.). The completion time for the tool was five minutes. The Trait Emotional Intelligence Questionnaire - Short Form (TEIQUE-SF) have shown good psychometric validity and have been used in many studies (Petrides, 2009; Andrei et al., 2015; Di Fabio and Saklofske, 2020).

BFI (The Big Five Personality Inventory)

Personality traits were enumerated as a score yielded by the BFI. The completion time was 20 minutes. The BFI has been used in many other similar studies and has shown good psychometric validity (John OP et al.,2012; Alansari, 2016).

Both tools mentioned above were adapted to Sinhala using the World Health Organization (WHO) recommended methodology for adapting psychometric tools for research (WHO, n.d.). During the preliminary discussions of the study, it was identified that there were no Tamil speakers who were followed up by the post-covid clinic. Therefore, an adaptation to Tamil was not carried out.

Both tools were freely available on their respective websites, with permission to be translated and adapted. During the adaptation process, the authors were updated with the final Sinhala versions and the back translations (the process of translating the Sinhala versions back into the original language to check for accuracy) of the scales.

Socio-demographic information of the participants was recorded using a self-developed socio-demographic data collection form.

Measurement of COVID 19 infection severity

The severity of the infection was classified as per the NIH Disease Severity Classification (NIH, 2021).

a. Asymptomatic or Pre-symptomatic Infection: Individuals who test positive for SARS-CoV-2 using a virologic test (i.e., a nucleic acid amplification test [NAAT]

or an antigen test) but who have no symptoms that are consistent with COVID-19.

b. Mild Illness: Individuals who show many symptoms of COVID-19 such as fever, nausea, vomiting, diarrhea, sore throat, cough, headache, malaise, muscle pain, and loss of smell and taste, yet who do not have symptoms like shortness of breath, dyspnea, or abnormal chest imaging.

c. Moderate Illness: Individuals who indicate lower respiratory disease (pneumonia) during clinical assessment or imaging and who have an oxygen saturation (SpO2) ≥94% on room air at sea level.

d. Severe Illness: Individuals who show evidence of pneumonia and have SpO2 <94% on room air at sea level, a ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (PaO2/FiO2) <300 mm Hg, respiratory frequency >30 breaths/min, or lung infiltrates >50%.

e. Critical Illness: Individuals who have respiratory failure, septic shock, and/or multiple organ dysfunction.

Presence of comorbidities: Diabetes, hypertension, asthma, chronic obstructive pulmonary disease (COPD), obesity, chronic kidney disease (CKD) (eGFR <60 for 3 months or renal damage as evidenced by albuminuria - >30 mg/g, imaging or/ pathological evidence of kidney damage or post-transplant), cirrhosis, any other disease according to the judgement of the managing clinician that warrants treatment at a hospital setting.

Additional classifications used in the study

f. COVID pneumonia: Patients' oxygen saturation is considered <95% on air or any oxygen or ventilatory support. Radiological guidance with a chest x-ray and HRCT was performed to identify the extent of pneumonia and its severity.

The interpretation of the X-rays was done using the RALE classification system. This system was presented by Wong et al. and published in "Radiology" in March 2020. Each lung was assessed individually and depending on the extent of involvement by consolidation or ground-glass opacity, a score of 0 to 4 points was given (0 = no involvement; 1 = less than 25%; 2 = 25% to 50%; 3 = 50% to 75%; 4 = more than 75% involvement). The overall score was the sum of points from both lungs.

A total severity score was used to evaluate the extent of the HRCT abnormalities. This method was presented by Kunwei et al. and was published in “European Radiology” in March 2020 (Li et al., 2020). In this classification system, each of the five lobes of the lungs was evaluated for the presence of inflammatory abnormalities, including the presence of ground-glass opacities, mixed ground-glass opacities, or consolidation. Each lobe could be awarded 0 to 4 points, depending on the percentage of the involved lobe: 0 (0%), 1 (1-25%), 2 (26-50%), 3 (51-75%), or 4 (76-100%).

Procedure

The number of participants who were assigned to each stratum of the sample was recruited for the study randomly using the clinic registry. These participants were contacted via telephone by a research team member to make them aware that there is a study being conducted and if they would like to receive information on the study to decide if they would like to participate in the study. The research assistant was trained regarding the key messages that were imparted in this initial contact with the patients.

Following the verbal consent of the participants to receive information, they were provided with the introduction to the study and the consent form. Once these had been filled out and sent back, the patients were given psychometric scales and the demographic information sheet to be filled out. The patients were provided a hard copy or an e-copy, depending on the patient’s preference. Patients who requested hard copies were provided with a stamped return envelope to ensure the patient did not bear any cost by participating in the study.

Data analysis

Initially, data cleaning and checks were performed, and IBM SPSS software was used to carry out descriptive statistics. A regression analysis was conducted using the IBM SPSS software among the scores yielded for each of the quantified variables and the demographic factors. The Pearson correlation coefficient was used to measure the strength of association between variables.

RESULTS AND DISCUSSION

Demographic factors and COVID severity

When the demographic factors and COVID severity were correlated, age, highest educational qualification, marital status, number of children, age of the youngest child, the number of times the participant has been diagnosed with COVID-19, or

income did not demonstrate a significant relationship to the level of severity of the COVID-19 infection (Table 1).

Employment status was observed to have a statistically significant, moderately negative correlation to the severity level of COVID-19 infection (R = -0.440, p = 0.001).

Table 1: Correlation between Demographic factors and the severity of the COVID – 19 infections

Demographic factor	**Perason's correlation coefficient**
Age	R= -0.195, P=0.170
Employment status	R= -0.440, P=0.001
Marital status	R= -0.101, P=0.481
Number of times diagnosed with COVID	R= -0.123, P= 0.394
Income	R= 0.275, P=0.051

Source: Developed by the Author

There was no significant relationship observed between the five personality traits (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) measured by the Big Five Inventory and the severity of the COVID–19 infection (Table 2).

Table 2: Correlation between five personality traits and the severity of the COVID – 19 infections

Personality trait	**Pearson correlation coefficient**
1. Openness	R= - 0.015, P=0.981
2. Conscientiousness	R= - 0.090, P= 0.531
3. Extraversion	R= 0.121, P= 0.399
4. Agreeableness	R= - 0.019, P= 0.894
5. Neuroticism	R= - 0.102, P= 0.475

Source: Developed by the Author

TEIQUE scores and COVID severity:

According to the current study, there was no significant relationship between the overall TEIQUE scores and the level of severity of the COVID-19 infection ($R = 0.082$, $p = 0.575$). There was no statistically significant correlation between individual items of TEIQUE and the severity level either.

DISCUSSION

A significant proportion of patients who had COVID-19 infections are believed to have continued symptoms, which is referred to as long COVID or post-COVID syndrome. Of these patients, psychiatric symptoms, including depression, anxiety, post-traumatic symptoms, and impaired cognitive impairment, have been observed in a significant proportion of patients. It is also believed that the risk of suicide may be elevated in both patients who develop post-COVID syndrome and those who do not (Sher, 2021). At present, most of these studies are correlational ones, and the mechanisms of causation have not yet been discovered. The current study explores two long-term psychological constructs in people: personality and the trait of emotional intelligence. According to the results of the current study, the two long-term psychological variables do not have a significant relationship to the severity of COVID-19 infections. The fact that no subscale of the BFI or TEIQUE- SF showed a significant relationship to the severity of the COVID-19 infection can be interpreted as an indication that these constructs are not even partly associated with the COVID-19 outcomes.

Past research has demonstrated that most people who go on to develop post-COVID syndrome are people who have had more severe levels of COVID-19 infections (Uniyal et al., 2022). Therefore, the outcomes of the current study suggest that the psychological disturbances that are observed in post-COVID syndrome are more likely to be related to the infection than the premorbid psychological variables of the individual.

In addition to that, it is important to note that most demographic variables also do not seem to have a relationship to the level of severity of the infection. Therefore, we can speculate that COVID-19, like any other communicable disease, can infect any person, irrespective of their sociodemographic variables. It is suggestive that the level of severity of the infection may depend on more biological variables, such as the potency of the virus and the biological condition of the infected, than psychological or other demographic variables. Therefore,

studies on post-COVID syndrome should focus more on the biological mechanisms underlying the disease condition.

It is interesting that, while income does not affect the severity of the infection, being unemployed appears to predispose people to more severe COVID-19 infections (Mirahmadizadeh et al., 2022). Therefore, the short-term stress and anxiety caused by being unemployed may be more significant in the COVID-19 infection than long-term economic factors and other demographic factors. It would be interesting for future researchers to explore whether short-term stress is more detrimental to infectious diseases compared to more stable psychological constructs such as personality traits.

It would be of particular interest to explore if short-term negative emotions such as stress, anxiety, and fear which are generated by the pandemic itself, increase the risk of acquiring the infection and subsequent severity of the infection. (Manchia et al., 2021; Bhattacharjee and Ghosh, 2021).

Since long-term psychological constructs do not appear to be associated with infection severity in COVID–19, it could be that short-term emotional status is more important in infectious diseases.

On the other hand, a pandemic is more likely to be once in a lifetime experience for an individual. Therefore, the long-term psychological repertoire of the individual may not be sufficiently prepared or equipped to handle the situation. Therefore, individual reactions could be based on other contextual variables in the immediate environment of the individual who is facing the pandemic. Therefore, long-term psychological constructs such as personality or trait emotional intelligence may have little predictive value in terms of the psychological outcomes of the person. It is expected that future researchers will attempt to explore these variables.

LIMITATIONS

The current study is a single-center, hospital-based study. Therefore, the findings cannot be extrapolated to the wider community. Large, population-size studies are required to further explore the correlation between COVID-19 disease severity, post-COVID adjustment, individual personality traits, and trait emotional intelligence.

CONCLUSION

It can be concluded that most psychiatric symptoms reported in post-COVID syndrome may be more related to the infection than the premorbid personality or other long-term psychological variables. Short-term stress due to unemployment appears to predispose individuals to more severe forms of COVID-19 infection.

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A Small-scale Study on Gender-based Violence in Public Transport in Sri Lanka

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ABSTRACT

Accentuated by a study done by the United Nation's Population Fund which revealed that 90% of Sri Lankan women have experienced harassment in buses and trains this study is situated in Sri Lanka, where street harassment is rampant. In this regard, this small-scale research is conducted to uncover a glimpse of gender-based violence in public transport from the perspective of targets and to destigmatize the view that the onus of responsibility of preventing gender-based violence in public transport lies with the targets rather than the perpetrators. This is a critical discourse analysis of interviews and narratives of targets of gender-based violence in public transport in Sri Lanka, in which theoretical viewpoints of Catherine Riessman (2008), Theo van Leeuwen (2008), and Michael Bamberg and A.Georgakopoulou (2008) would be employed as the framework of analysis. It is further attempted to explore the dominant discourses and master narratives that are thus associated. In this respect, this research unravels as a small-scale study that employs a sample size of five interviewees who self-identified as victim-survivors of gender-based violence in public transport. The main findings of this study underline that the agency of the research participants was considerably at risk at the very moment that they entered a mode of transport. It was also argued that regaining targets' agency from an incident of gender-based violence in public transport is an interdiscursive practice, which occurs as an amalgamation of varying discourses under a patriarchal master narrative. This study concludes with an emphasis on the rampancy of gender-based violence in public transport as stated at the onset, highlighting the influence of the patriarchal power structures that pervade.

KEYWORDS: Gender-based violence, public transport, critical discourse analysis, narrative analysis, agency

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INTRODUCTION

“How do you have a conversation with somebody and expect their husband to play with themselves in front of you? Right? How do you have that conversation?” (Angela, personal communication, 22-08-2019)

Angela, who was one of the participants in this research, asked these questions at her interview to which there was no answer. Although she complained to the police about her harasser, she did not pursue her complaint because her harasser was a breadwinner of a family with a wife who had no income and three children. This paper is based on a small-scale study that was done as partial fulfilment of the Master of Arts degree in English Language Studies at the University of Malaya, Malaysia in 2019.

In 2015, a United Nations Population Fund (UNFPA) report stated that 90% of Sri Lankan women experience sexual harassment in buses and trains. This report also stated that 82% have been in the presence of sexual harassment being inflicted to someone else. Another noteworthy finding is that out of the 90% of women who were harassed, only 4% had made a complaint to the police. How this harassment takes place can include a variety of practices including, groping, indecent exposure, rubbing genitals against another’s body which is known as ‘jacking’ in informal contexts, and improper seating etiquette.

THE STUDY

A few pointers that can be understood from the current state of gender-based violence in public transport (GVPT) can be listed as follows: Firstly, sexual violence in buses and trains is rampant and justice against the perpetrators through police is sought after rarely. The social norms surrounding gender-based violence in public transport focus on the targets for having the onus of responsibility of preventing such violence (Butt and Sekaram, 2019).

From a linguistic perspective, disclosing accounts of the victim’s/ survivor’s experiences of GVPT is seen as catering to their ‘justice needs’ whereby they are given ‘voice’ to ‘express their experiences in a meaningful way’ (Fileborn, 2016, p.1484). Further, it is seen as a trivialised issue (Kissling, 1991; Vera-Gray, 2016), which further silences the victims and strengthens the perpetrators. These observations thus construct the research problem for this study which addresses the need for linguistics-related research on gender-based violence in public transport whereby the accounts of victims are explored.

Therefore, the overarching objective of this study is to delve into the master narratives that are associated with gender-based violence in public transport in

Sri Lanka. It was also deemed necessary that one hears the perspective of the target as a form of resistance to the view that the target should be accountable for preventing the violence that is perpetrated against them.

It was also an attempt to expand the discussion on gender-based violence in public transport to incidents that could occur in tuk-tuks, taxis that are hailed through e-hailing apps, and while being a pedestrian. The two research questions that are posed for this purpose are: 'How do the targets of gender-based violence in public transport identify themselves and the perpetrators through accounts of their experiences?' and 'What social realities can be deciphered through these accounts?'.

LITERATURE REVIEW

Critical Discourse Analysis (CDA)

Theo Van Leeuwen argues that "all texts, all representations of the world and what is going on in it however abstract, should be interpreted as representations of social practices" (ibid, p. 5). He discusses numerous elements of social practices such as participants, actions, performance modes, times, locations and resources which would be recontextualised in texts. Van Leeuwen (2008) thus argues that the social practices are recontextualised in texts, conveying that the exact social practice would not be apparent in the text. He posits that the 'actual' social practice would undergo various transformations such as substitutions, deletions, rearrangements, additions, repetitions, reactions, purposes, legitimations and evaluations (Van Leeuwen, 2008).

Narrative Analysis

A view that is similar to Van Leeuwen's (2008) position on discourse as a recontextualised social practice is put forward by Catherine Riessman (2008). Discussing narrative analysis and the narratives that are unearthed through various sources, Riessman argues that the accounts that are analysed in narrative analyses are a reconstruction. Firstly, the speaker/ writer reconstructs the accounts from their memory. Secondly, they are left open for the interpretation of the investigator, which is another form of reconstruction of the account. Even though this does not directly convey a relationship between the narrative and society, it puts forth a characteristic about its relationship with the individual who narrates.

This study employs the narrative practice approach put forth by Bamberg (2015) as the analytical approach of this study. He states six standpoints from which the narrative practice approach could be viewed. They (Bamberg, 2015, pp. 3-4)

constitute the assumptions that narratives are fragments of larger interactive activities, that narratives often resemble texts, that "stories/ narratives typically consist of references to a world of actors, places and events which are references to something that happened typically as having taken place in the past and consisting of more than one event", that this world could be about the narrator or someone else in which the narration follows a particular structure, that these are narrated for a certain purpose, and that these narratives reveal aspects of who they are.

The discourse of gender-based violence in public transport

Kissling (1991, p. 454) has discussed how GVPT (in her study, street harassment) is a manifestation of how men confine women to private spaces and 'scare them away' from public spaces which are perceived to be owned by men. She thus states that the intimidating and sexual nature of street harassment may remind women of the consequences of trespassing into those male spaces (ibid). These arguments suggest that GVPT acts as a method that reinforces the binary gender expressions of masculinity and femininity and widens the cleavage between them. It also posits that GVPT strives to keep women in 'their place' without trespassing on the supposedly male space.

Davis (1994) observes the street as a gendered space. She argues that GVPT is a part of a larger process of exercising patriarchal control over women. She states that as a result, GVPT transforms the streets into a space where the gender hierarchy is perpetuated (Davis, 1994). In defining GVPT (street harassment according to Davis), she argues that there are a few lenses through which we can view GVPT; "normatively", through identifying the acts that can be considered gender-based violence in public transport, "the locale" focusing on the relationship between the harasser and the target, and "systemically", where one looks at it as "an element of a larger system of sexual terrorism" (ibid, p. 138). This study is focused specifically on observing GVPT through "the locale" and "systemically" (ibid).

Interestingly, many of the views on GVPT seem to presume that women are the targets and that men are the perpetrators. This renders a silence in respect to non-binary and gender-fluid persons. An argument for using the women/ men binary to discuss GVPT is found in Boyle (2019) who states that the commonality in women being abused is not always the male abuser but misogyny. Although this view takes away the 'male' perpetrator from the presumptions it is still silent regarding male and non-binary targets. Discussing the same issue, Turchik, Hebenstreit and Judson (2016, p.140) maintain that the underrepresentation of

targets whose gender is not female leads to a lack of acknowledgement of them being targets of sexual assault. This study takes a similar position: while acknowledging that women are targeted quite rampantly in GVPT, it does not discard the possibility of men being targets.

Referring to GVPT in the intersections, Davis (1994, p.134) discusses GVPT and calls it “the harm that has no name” connecting it to the experiences of African American women. Fogg-Davis (2006) has investigated how GVPT takes place in America, especially in the case of African American lesbians. Despite the acknowledgement that African American women are doubly marginalized due to their gender and race, it is argued that African American men use GVPT for the same purpose that was highlighted above; to control women. Fogg-Davis (2006, p. 64) thus argues that “we can acknowledge that black men’s relationship to patriarchy is complicated by race and still be critical of individual black men who use street harassment to monitor, intimidate and control black women”.

The relevant literature also points out that this phenomenon of GVPT is called ‘eve teasing’ in India which shares similar cultural values with Sri Lanka. Introduced as a “culture-specific” (Nieder, Muck, Kartner, 2019, p. 3) Indian English term, ‘eve teasing’ has also been criticized as a euphemistic way of referring to GVPT which trivializes it and shifts the blame to the targets (ibid). In the above research which probes into the coping strategies of selected young Indian women in the face of GVPT “restrictions on mobility, clothing, sexuality and education” (ibid, p.9) are highlighted as the most frequent coping strategies. The restrictions on mobility as stated point to one of the main preoccupations in this study which is the agency of the targets.

In the research on GVPT that is done in respect of the context in India, a significant group is underlined as being instrumental in determining the agency of the female targets: their families (Nieder, Muck, Kartner, 2019; Dhillon, Bakaya, 2014; Talboys et al, 2017). These studies show the way the families of the female targets have imposed restrictions on their mobility to prevent them from being subjected to GVPT; imposing restrictions as such may suggest a victim-blaming mentality and a frantic need to protect the women from the perpetrators of GVPT.

RESEARCH METHODS

Primary Data

Ten narratives were obtained from five self-defined targets of gender-based violence in buses, tuk tuks, trains, and in roads while being pedestrians as the primary data of the research. The interviews were semi-structured, and facilitated

in a way that would aid the research participants to construct narratives on the research topic. However, there was a direction of concerns such as the particulars of incidents of GVPT, their responses, their views on the role of law and police and the ways that they acted against GVPT as bystanders.

The only criteria for selecting participants for the interviews was that they self-identified as targets of gender-based violence in public transport. The reason for this approach of identifying participants was the fluid nature of the ways that GVPT could occur and the understanding that it could occur irrespective of demographic differences. The relevant literature revealed that GVPT cannot be objectively defined and that the definitions should depend on how the targets perceive it (Hutson, Krueger, 2018, p.4).

However, out of the five participants, two identified as lesbians and the other three were heterosexual. One participant described their gender as non-binary while the other four participants identified as cisgender (female). They were in the age range of 25 years to 34 years.

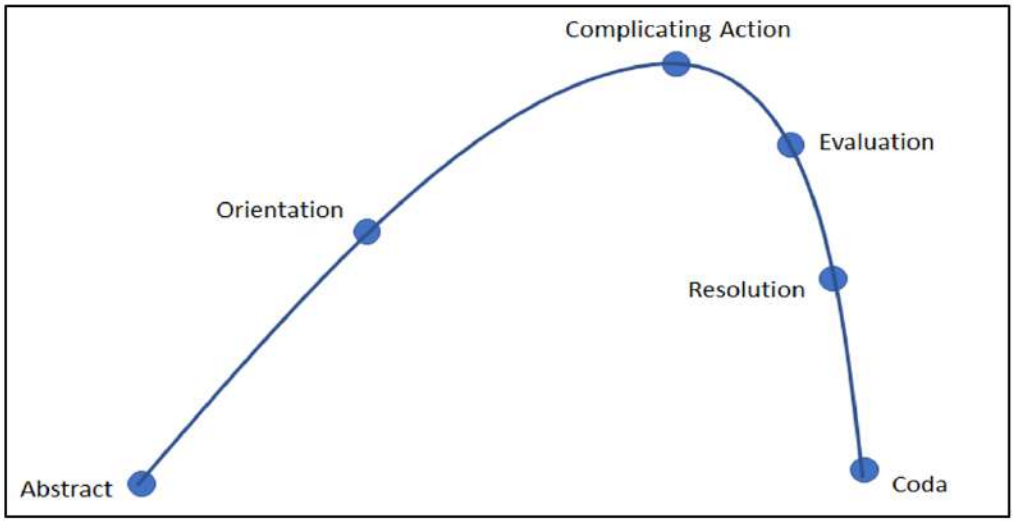
Method of Analysis

This analysis is a critical discourse analysis using a narrative analysis approach. In this regard, Theo Van Leeuwen's (2008) views on discourse as a recontextualized social practice alongside the views of Bamberg and Georgakopoulou (2005) regarding narrative analysis would be incorporated. The interviews are considered a discoursal interaction between the investigator and the participants. It is thus acknowledged that the subjectivity of the investigator would have a role to play in the process of conducting the interviews.

The data analysis is carried out in a few steps. Firstly, the corpus consisting of the interviews with the five participants was processed through Wmatrix4 concordance software to obtain the negative words, emotions and roles, and keyness of the groups. The results of WMatrix4 processing are intended to be the basis of the findings of the narrative analysis.

Secondly, two harassment stories from each target would be arranged according to the structure of Labov and Waletzky (Mishler, 1991, p.77-78). A model of this is provided below (Figure 1).

Figure 1: Labov's model of narrative



Source: Labov and Waletzky (Mishler, 1991, p.77-78)

As some participants narrated numerous experiences related to GVPT, only two accounts would be considered for further analysis. Furthermore, the purpose of arranging the accounts according to the narrative structure of Labov is for the better understanding of the development of the event.

Once the accounts are arranged as thus, the data is analyzed using the social actor analysis introduced by Van Leeuwen (2008). Although the social actor model supplies numerous ways through which social actors could be represented, for this research, 'activation', 'passivation', 'dissociation', 'identification', and 'backgrounding' (ibid) vis-à-vis the positioning levels posited by Bamberg and Georgakopoulou (2008) are taken into account.

The main reason for using this approach from the words of Riessman (2008, p. 13) is, that a good narrative analysis prompts the reader to think beyond the surface of a text, and there is a move towards a broader commentary. As the research objectives convey, the discussion is developed into a broader social critique of the gender relations in Sri Lanka that is reflected in GVPT. As the researcher, I position myself as coming from a background where GVPT is part of daily life and being a victim of it is normalized and trivialized. Hence, the agency of the victim or survivor would be the focus in this small-scale study.

The specific reasons for using the concept of "positioning" are two-fold: The Wmatrix4 results point to a difference in subject positioning between females and males and it identifies them as two distinct groups. Furthermore, the research

questions that mark the difference between the targets of GVPT call for an approach that discusses positioning.

Ethical Concerns

Many of the participants identified to be in a grey area of being a victim and a survivor of GVPT. As the research probes into personal and emotionally taxing experiences that they underwent i.e. their experience of being harassed in public transport, this qualifies to be considered 'sensitive research' (Dickson-Swift, James, Liamputtong, 2008, p.3). Therefore, varying measures were taken so that discussing their experiences related to harassment would not have a negative effect on the mental health of the participants. The interviews were done in safe environments whereby the participants felt comfortable to discuss their experiences. Safety protocols were followed, and it was emphasized that they are able to stop the interview and/or withdraw themselves from being a participant at any given time, without having to give prior notice. After the interview was completed, the participants were followed up regarding their state of mental health after discussing their experiences.

DATA ANALYSIS

Preliminary Analysis

The four interviews that were done with the targets were processed through WMatrix4 (see below). The results of WMatrix4 processing on roles and keyness in comparison with the British National Corpus Written Sample would serve as the basis for the analysis.

Figure 1: Frequency of roles according to WMatrix4

Word	Frequency	Relative Frequency	
bystanders	3	0.02	Concordance
teachers	3	0.02	Concordance
ubers	2	0.01	Concordance
trousers	2	0.01	Concordance
passengers	2	0.01	Concordance
mirrors	2	0.01	Concordance
lawyers	2	0.01	Concordance
bus_drivers	2	0.01	Concordance
bus_conductors	2	0.01	Concordance
stickers	1	0.01	Concordance
survivors	1	0.01	Concordance
hoppers	1	0.01	Concordance
outsiders	1	0.01	Concordance
neighbors	1	0.01	Concordance
answers	1	0.01	Concordance

Source: Developed by Author

Figure 2: Frequency of keyness according to WMatrix4

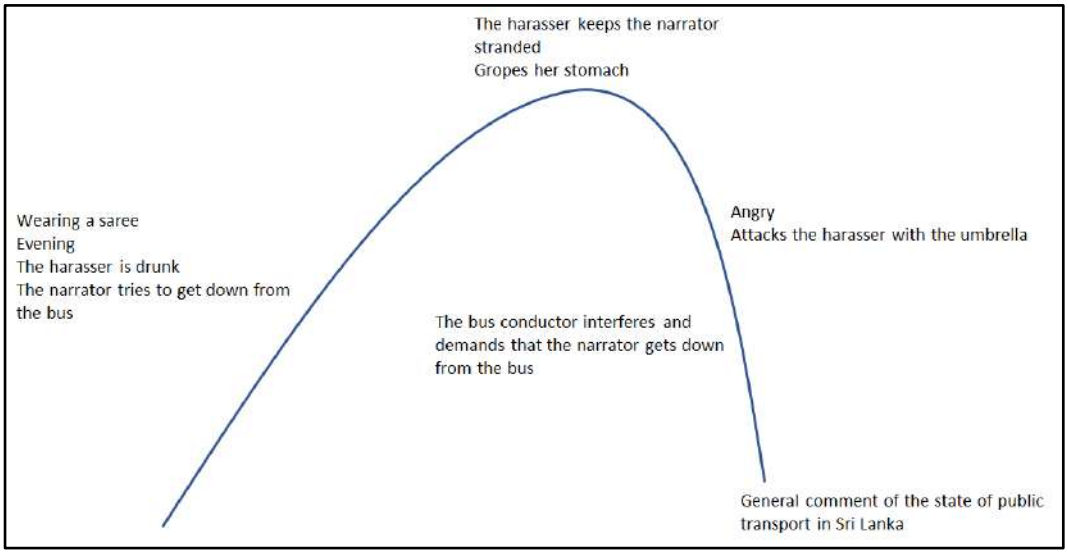
		Item	O1	%1	O2	%2	LL	LogRatio	
1	List1 | Concordance	M3	179	1.16	2115	0.22 +	302.12	2.43	Vehicles and transport on land
2	List1 | Concordance	Z99	296	1.92	5684	0.58 +	289.38	1.73	Unmatched
3	List1 | Concordance	S2.1	100	0.65	875	0.09 +	216.53	2.87	People: Female
4	List1 | Concordance	A2.1+	135	0.88	2031	0.21 +	178.53	2.08	Change
5	List1 | Concordance	X3.3	30	0.19	69	0.01 +	130.93	4.79	Sensory: Touch
6	List1 | Concordance	S2.2	110	0.71	1829	0.19 +	129.55	1.94	People: Male
7	List1 | Concordance	S2	137	0.89	2728	0.28 +	127.26	1.68	People
8	List1 | Concordance	E3-	74	0.48	959	0.10 +	114.38	2.30	Violent/Angry
9	List1 | Concordance	N3.6	20	0.13	67	0.01 +	75.10	4.25	Measurement: Area
10	List1 | Concordance	B5	86	0.56	2080	0.21 +	58.63	1.40	Clothes and personal belongings
11	List1 | Concordance	B1	121	0.79	3703	0.38 +	50.73	1.06	Anatomy and physiology
12	List1 | Concordance	G2.2-	29	0.19	338	0.03 +	49.56	2.45	Unethical
13	List1 | Concordance	G2.1	67	0.43	1639	0.17 +	44.76	1.38	Law and order

Source: Developed by Author

Secondary Analysis

4.2.1. Narrative Analysis 1 (Gangulali - Interview 1 - Narrative No. 1)

Figure 3: Narrative 1 by Gangulali according to the narrative analysis model



Source: Developed by Author

The incident described in the narrative takes place on a bus, whereby the narrator is groped while trying to get down from the bus.

The way the agency of the narrator is threatened through the invasion of her personal space is shown via her choice of verbs. The narrative reads, ‘When I try to get down from the bus this man is keeping me stranded where I am and does

not let me get down' (Gangulali, personal communication, 17-08-2019). Here, the narrator uses two expressions to convey her immobility; she is 'kept stranded' by the harasser and he does not 'let' her get down from the bus. Further, the clause 'I try' semantically points to a limitation of agency and an attempt to resist.

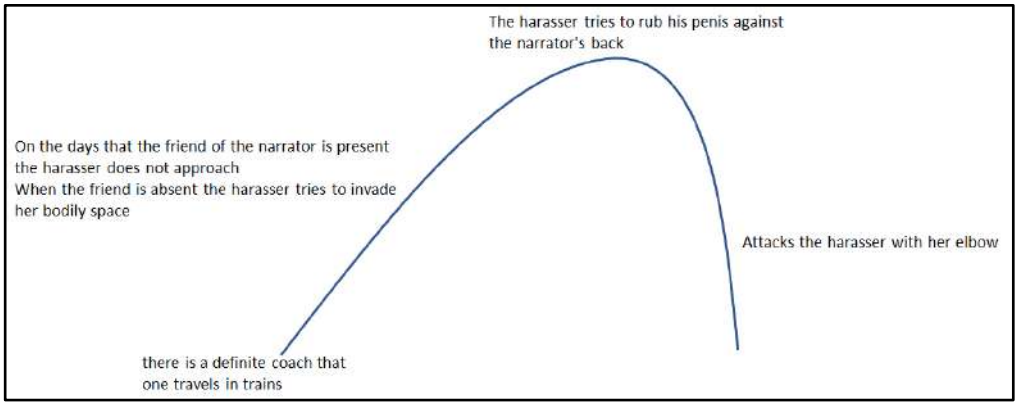
The narrative reads, 'Suddenly, this man put his hand through my saree and squeezed my belly' (Gangulali, personal communication, 17-08-2019). The repetitive use of the possessive pronoun 'my' in two instances within the sentence, as 'my saree' and 'my belly' suggests the awareness of the bodily space and in-turn, the invasion of it. The activation (Van Leeuwen, 2008, p.33) of 'this man' and the passivation (ibid) of the narrator further accentuates this point.

However, the narrator gains her agency back when she 'pushes' the harasser away. Her action of hitting the harasser with her umbrella thus can be considered an act of resistance against the harassment.

This regaining of her agency is threatened again when the conductor demands her to get off the bus - siding with the harasser. In the evaluation (Figure 4), the narrator poses the question of how her choice of wardrobe resulted in her being harassed; this instance shows the perspective of the conductor who compelled the narrator to stop resisting the harasser. It reads, "conductor assumed that this is what happens when you expose your belly" (Gangulali, personal communication, 17-08-2019). The narrator's rather specific involvement with the choice of her wardrobe (I'm wearing a saree) may showcase her prior knowledge about this perspective.

4.2.2. Narrative Analysis 2 (Gangulali - Interview 1 - Narrative No. 2)

Figure 4: Narrative 2 according to the narrative analysis model



Source: Developed by Author

This narrative discusses an incident where the harasser tries to rub his genitals against the target's back (See Figure 5). The target attacks the harasser to resist the harassment.

The narrator situates the in-groups and out-groups within the trains in Sri Lanka and the specific culture that is built in trains. The abstract of the narrative (See Figure 4) talks about the culture that is built amongst the passengers. The narrative thus reads, "there are cliques in trains; there is a specific coach for each clique that they typically travel everyday" (Gangulali, personal communication, 17-08-2019). Accordingly, each clique that travels together in the train constitute the in-groups whereas the rest of the passengers' become members of the out-group.

The narrator 'usually' travels with a'friend' who is identified relationally to her as 'my friend' with the possessive pronoun 'my'. Interestingly, in the same way that she described the bystander in Narrative 1, she identifies the friend alongside his gender: male.

The narrative reads "I have observed this man before in another place, but when my friend is absent, he stands near me" (Gangulali, personal communication, 17-08-2019). The narrator builds the narrative between the harasser and herself with the friend although absent, in a way that suggests a triangular formation. The rest of the passengers are 'suppressed' (Van Leeuwen, 2008, p.29).

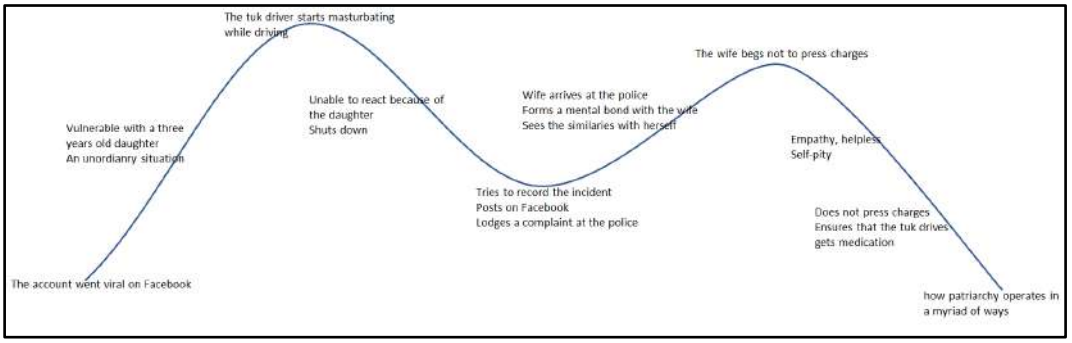
Considering the crucial part that this 'male friend' of the narrator plays in the narrative, an observation could be made regarding the narrator's agency. Although the narrator has prior knowledge of GVPT to decipher the harasser's intentions, her agency to travel freely on the train depends on the presence of her friend. The harasser stalks her but is hesitant to invade her bodily space when the friend is present.

In the complicating action, she regains her agency by attacking him from her elbow. In this instance, the agency that she had effortlessly in the presence of her friend, is lost and reclaimed effortfully.

It should also be noted that she identifies the genitalia of the harasser as a 'gadget'. According to Oxford Learners' Dictionaries (2019), a gadget is "a small tool or device that does something useful". It is also said that 'you sometimes refer to something as a gadget when you are suggesting that it is complicated and unnecessary' (Collins Cobuild Dictionary, 2019). Thereby, the narrator's description of the genitalia of the harasser to resemble a 'device' may resonate with the notion that the harasser utilizes his 'gadget' to control the space that the

narrator occupies and to constrict her agency. Rather symbolically, his genitalia become the device through which his rather invisible control over her is exercised.

Figure 5: Narrative 1 by Angela according to the narrative analysis model



Source: Developed by Author

4.2.3. Narrative Analysis 3 (Angela - Interview 2 - Narrative 1)

This narrative differs from the other narratives because it contains two complicating actions (see Figure 6). Aligning with the other narratives, the complicating action of the first half is the harassment: The target is harassed when she is taking her daughter to the preschool. When she attempts to press charges against the perpetrator, the perpetrator's wife interferes which leads to the target underreporting the incident. Thereby, its resolution is complicated again when the expected resolution is hindered by the introduction of the harasser's wife to the narrative.

This narrative contains two micro-narratives of sexual harassment within the narrative. One is when the narrator reveals her experience to the teacher of her daughter's Montessori. The other is when she comes home and reveals her experience to her maid. Both social actors, the teacher and the maid are classified alongside their gender with the narrator's use of feminine pronouns such as 'she' and 'her'. In this instance the narrator utilizes overdetermination to associate herself with the teacher and the maid; although they played different social roles, all three of them are equally potential targets of sexual harassment.

The target's effort to make it seem as if she is recording the harasser shows her agency to be in a blurred space because she is in a vulnerable place with her daughter next to her. However, the fact that she made a conscious effort to see if the harasser has an erection marks the point that she regains her agency; it can be observed that the narrator activates herself after the instance that she looks to

see if the harasser has an erection. The resolution of the first half of the narrative begins afterwards when the narrator takes a photograph of the license plate.

The resolution of the first complicating action takes several turns: as the action unfolds, the narrator attempts to video record the harassment (see Figure 6). She is looking 'specifically' to see if the harasser has an erection also adds to the resolution as it supports regaining the narrator's agency. Furthermore, she involves the social media discourse into the narrative by posting about her experience on Facebook.

The narrator is given a 'unique space' in the social media discourse to resist these norms and accentuate her agency. The narrative reads as follows: '...I write back to them saying I know what you said, this is my experience, you don't necessarily have to believe me, but this is what happened' (Angela, personal communication, 22-08-2019). The clauses such as, 'I write' and 'I know what you said' refer to mental processes and activates the narrator. The commentators of her Facebook posts are beneficiaries in this context and their identity is suppressed. As stated, these semantic and lexical choices activate the narrator as the main force and emphasize her agency.

In the resolution the narrator also makes an entry at the police at which point the second complicating action takes place. New social actors are introduced to the narrative at this instance: the woman police officer and the wife of the harasser.

The wife of the harasser is kept anonymous and initially identified concerning the harasser. However, the fact that she is relationally identified with the harasser is blurred when the narrator identifies her alongside herself: Firstly, she states that they smiled at each other conveying a positive connection. She also states that the wife made a positive impression further identifying her with her age. Also, the fact that the wife's children are of the same age as the narrator's is brought in. The narrator then identifies the wife with the action of crying because of the same incident: her being harassed. The narrator considers the wife to be in the same group as her, and an indirect victim of the harassment that was caused to the narrator. The gender of the narrator and the wife of the harasser are brought in to linguistically mark that they are associated together while the harasser is being dissociated. The use of identification can be deciphered in this context which supports categorizing the wife of the harasser and the target into one group.

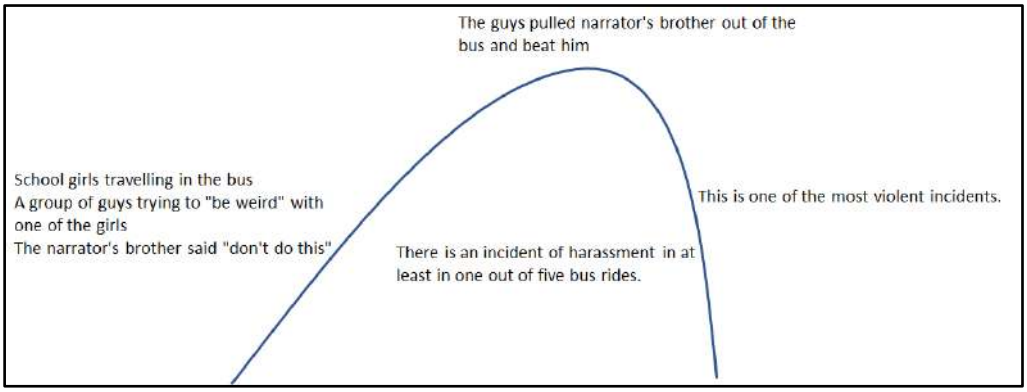
Regardless of the observation that the wife of the harasser is identified alongside the narrator, she is anonymized. Therefore, her identity is backgrounded in the

narrative, and we are compelled to refer to her as the ‘harasser’s wife’. This could be considered a symbol of her inferior role in comparison to the harasser.

A point that should be noted in this regard is that the wife, with whom the narrator identifies, is attempting to stop a resolution to the first complicating action from taking place. Nevertheless, the narrator can see through the socioeconomic discourse in the wife’s plight, which urges her to associate herself with the wife. In this case, the harasser can maintain his agency which is exercised through his wife. The economic discourse here, whereby the wife of the harasser is not employed (thus financially dependent on the harasser) becomes a force that supports the harasser in gaining and maintaining his agency. Simultaneously, this leads to the loss of the agency of the wife.

4.2.4 Narrative Analysis 4 (Angela - Interview 2 - Narrative 2)

Figure 6: Narrative 2 by Angela according to the narrative analysis model



Source: Developed by Author

Diverting from the other narrative that are analyzed; the target of this narrative is a male. Interestingly, he acts as a bystander against an incident of GVPT (Figure 7). The target who is a bystander to an incident of GVPT interferes and gets assaulted by the harassers.

The narrator classifies all the social actors alongside their gender. Accordingly, the social actors in the narrative are the narrator’s brother who is identified in relation to her, “a bunch of school girls” and “a bunch of guys” (Angela, personal communication, 22-08-2019). The orientation (Figure 7) portrays an attempt of GVPT against girls by the said ‘bunch of guys’ as the reason that compelled the brother to speak up. In this depiction, the girls and the guys who attempted the GVPT are dissociated in a way that they are situated as opposites. The brother

whose gender as a male is conveyed through the noun (i.e. my brother) that is used to identify him, and he situates himself with the girls to resist the GVPT that is done against one of them. He is then forced to bear the consequences of his decision, as he is assaulted for standing up against GVPT.

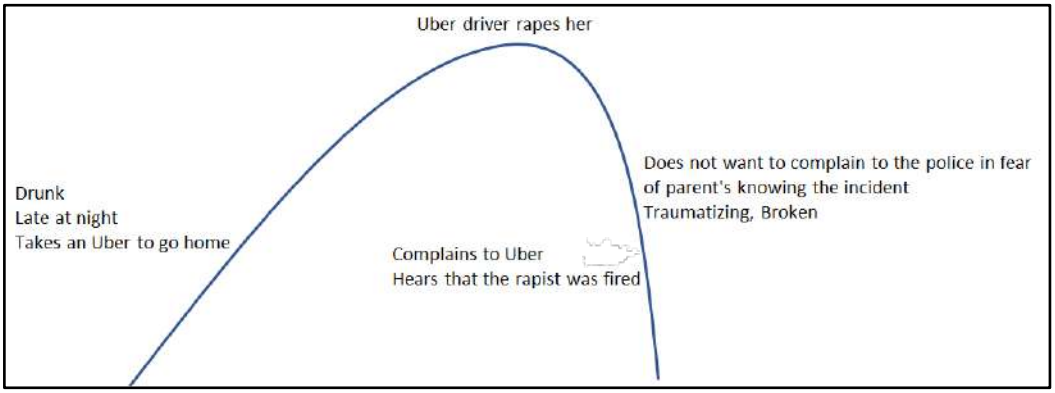
The narrative reads that the brother of the narrator was beaten up like a 'human punching bag', conveying that he was being treated as an object by the harassers.

The rest of the bystanders apart from the narrator are also radically excluded (suppressed) in the narrative. The narrator does not intervene, and her gender is 'female'. This would coincide with the observation that the agency of the women is minimal in comparison to the men. The fact that the narrator behaves as a passive agent in this situation may further convey the extent to which the discourse of GVPT is 'gendered' (Sunderland, 2004, p. 21) to benefit men and to passivize the women.

4.2.5 Narrative Analysis 5 (Keen - Interview 3 - Narrative 1)

This account constitutes clearly defined in-groups and out-groups which have significant roles to play in the resolution (See Figure 8) of the narrative. As showcased in Figure 8 the target who is drunk and unable to consent is raped by a car driver obtained through an e-hailing app. The target does not want to complain to the police in fear of requiring telling her parents about the incident. Repetitively, the narrator refers to the target as "a dear friend of ours" (Keen, Personal communication, 24-08-2019) in the orientation which conveys the classification of her in the in-group as the narrator.

Figure 7: Narrative 1 by Keen according to the narrative analysis model



Source: Developed by Author

When the narrator persuades the target to lodge a complaint at the police, the out-group can be inferred. Although she had been raped (objectivated), which clearly amounts to severe psychological trauma, she does not want to report the crime that was done to her because “she will lose her freedom” (Keen, Personal communication, 24-08-2019) if her parents knew. This is an instance whereby the cultural discourse intersects with the resistance of GVPT and thus suggesting the possibility of perpetuating a woman’s disadvantaged subjection to the larger cultural norms.

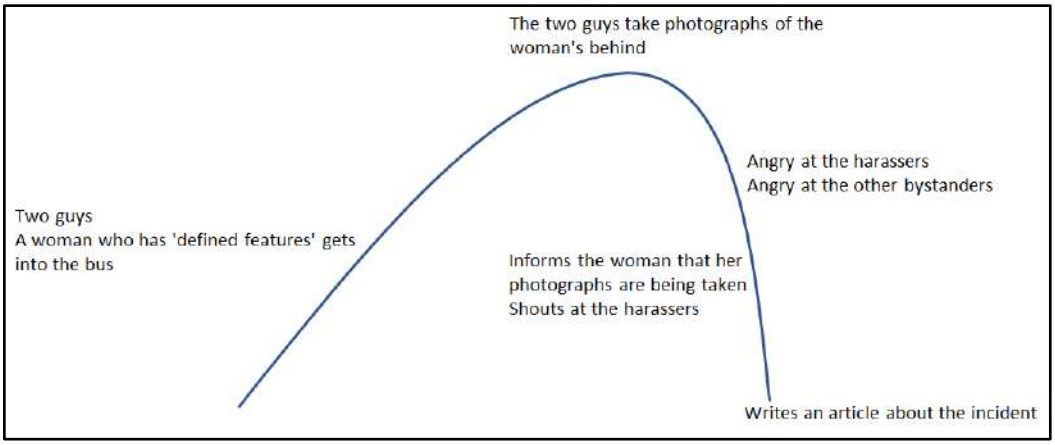
The target’s concern about whether she will lose her freedom if she opens to her parents about the rape unveils another side to my ongoing discussion on the target’s agency. The target’s agency is already restricted because of the relationship she has with her parents (a submissive role to her parents). In this context, she is given two options regarding the preservation of her agency: to resist the rapist and open about her experience, which according to the narrative, would result in restricting her freedom to spend time with her friends, or to conceal the fact that she was raped and preserve her agency. In this situation, the parents become a part of the out-group which contributes to her oppression. What the above-stated options of the target suggest is that the agency regarding one incident would also unfortunately mean the lack of agency regarding the other.

A few discourses intersect in resulting in this threatening of the target’s agency: the discourse on complaining to the police, the cultural discourse related to the interrelationship between the target and her parents and the patriarchal social discourse of Sri Lanka in general. The narrator makes a general commentary on gender relations in Sri Lanka which supports my position of the latter, which reads, ‘this country is where they won’t trust the woman’s words, they want to ask some man’ (Keen, Personal communication, 24-08-2019).

4.2.6. Narrative Analysis 6 (Keen - Interview 3 - Narrative 2)

This narrative depicts the harassment of a woman from the perspective of a bystander. The type of harassment that the narrator describes diverts from the types of harassment that were discussed in the previous narratives: in this narrative, the harassers take pictures of the victim’s/ survivor’s behind without her consent, invading her privacy and thus threatening her agency.

Figure 8: Narrative 2 by Keen according to the narrative analysis model



Source: Developed by Author

The detail that the target has “defined features” (Keen, Personal communication, 24-08-2019) is provided in the orientation (Figure 9) of the narrative, thus associating it with the complicating action. The interview with the narrator who is a masculine-presenting non-binary person, revealed that they were not being sexually targeted once they have begun to present more masculine. This reference to the body of the target who has a traditionally feminine body, coupled with the above detail from the narrator implies that it is the feminine expression that is being targeted by the harassers.

The social actors that are activated in the narrative i.e., the target and the harassers are identified through their gender. The narrator refers to the victim as “this lady” (Keen, Personal communication, 24-08-2019) whereas the harassers are identified through the noun phrases “two guys” and “these men” indicating their gender.

As stated earlier, this narrative showcases a bystander intervention; simultaneously, the narrator evaluates (Figure 9) the response of the rest of the bystanders. Line 8 reads, “I was so angry, my blood started boiling, like I was so angry, when I saw that no one said anything I mean it’s a flash, who wouldn't see that” (Keen, Personal communication, 24-08-2019). Significantly, this is a reaction to the lack of intervention by the rest of the bystanders rather than to the harassment. Thereby, the narrator associates the fact that the flash of the phone camera could be seen with the fact that the rest of the bystanders did not speak out implying that the harassment was done in front of numerous people who did not try to intervene. While the narrator associates herself with the target,

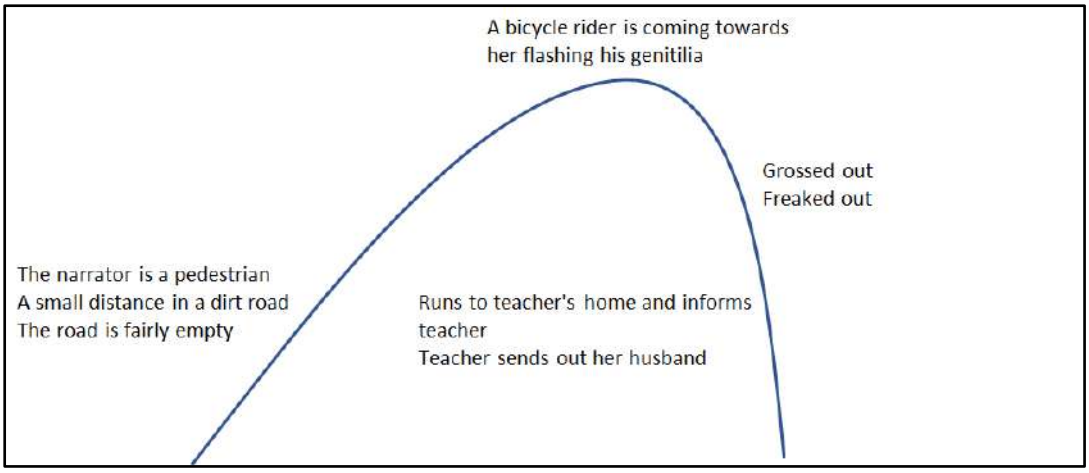
activating her role as an intervening bystander, the rest of the bystanders remain passivized.

The target did not know that her privacy was being violated until the narrator intervened, at which point she resisted the harassers. The target was able to gain the agency that she lost because of the bystander's intervention. She was able to resist the harassment that was being done to her and the intervention of the narrator may have acted as a reinforcement. In this instance, the significance of bystander intervention is highlighted as it caters to the target regaining her agency.

4.2.7. Narrative Analysis 7 (Ruby - Interview 3 - Narrative 1)

Diverting from the other narratives which took place in vehicles, this narrative (See Figure 10) takes place when the narrator was a pedestrian. When she walks to her class on a dirt road, a bicycle rider flashes his genitals to her.

Figure 9: Narrative 1 by Ruby according to the narrative analysis model



Source: Developed by Author

The narrator's use of negative emotions and actions in the evaluation of the narrative betrays the loss of agency after the complicating action i.e., the harassment. The verb phrases in the orientation read as "I got down", "I walked past", "I wanted to", and "I looked ahead" (Ruby, Personal communication, 24-08-2019) in which the agency of the narrator is clearly shown.

However, in the evaluation, the verb phrases read as 'I was so grossed out', 'I was so freaked out' and 'I couldn't understand' (Ruby, Personal communication,

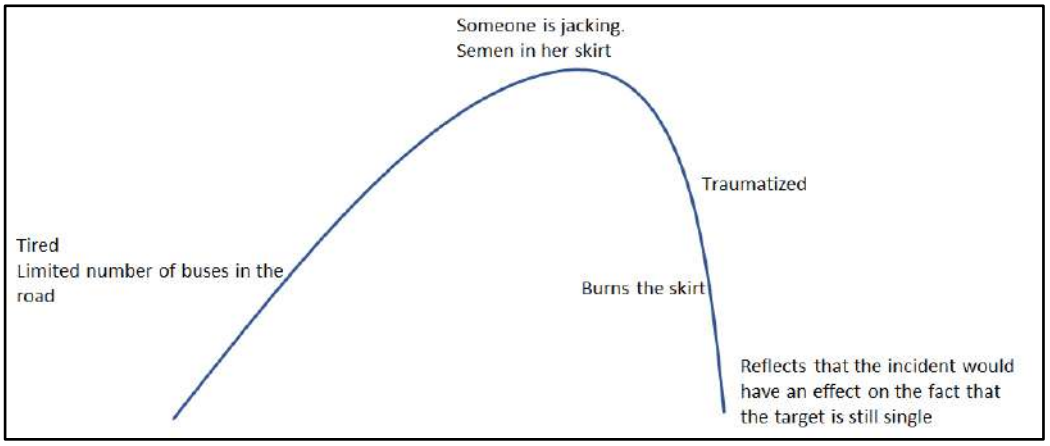
24-08-2019) which are all negative emotions that convey the threat to her agency. The narrator who was walking along the dirt road is compelled to run to the teacher's house because of the complicating action.

There is no statement relating to complaining to an authority regarding the harasser. It is made clear that the harassment took place on a rather domesticated road, which means that the rest of the students are also vulnerable to such harassment. Taking an action that goes beyond sending the teacher's husband to check if the harasser is still there, is suppressed in the narrative. Many narratives that were discussed thus far, do not contain the element whereby the target attempts to make a complaint to the relevant authorities. This would be indicative of the distrust in the police and the lack of agency of the target.

It should also be pointed out that it was the husband of the teacher who was sent out to look for the harasser. The husband being a male, and the harasser also being identified as a male thus constitute the in-group and the out-group respectively. What is interesting here is that a man is employed to regain the agency that the target lost through an action of another man. From this gendered identification and the play on agency in the narrative, it can be deciphered that the agency of the narrator is at the hands of these male social actors in this context.

4.2.9. Narrative Analysis 8 (Ruby - Interview 3 - Narrative 2)

Figure 10: Narrative 2 by Ruby according to the narrative analysis model



Source: Developed by Author

The orientation plays a vital part in determining the agency of the target at the time of harassment: the narrative reads that “They don't have a lot of buses in that road actually so after work she has to catch that bus” (Ruby, Personal communication, 24-08-2019) clearly indicating that the access to public transport is limited to the target. As a result, the bus is packed, which restricts her bodily agency. I observe that due to the discourse regarding the access to public transport the target’s physical agency is limited even before she got harassed. This is combined with her being harassed because the harasser takes advantage of the fact that she cannot move (defend herself) in a jam-packed bus. Thereby, in this narrative, the target’s agency is threatened from two sources: firstly, the economic discourse of the country that hinders her access to safe and spacious public transport, and secondly, the harasser who utilizes the first factor to harass her.

As the complicating action unravels, the narrative reads, “When she went home and took off her clothes, she saw semen, [at the] back of her skirt” (Ruby, Personal communication, 24-08-2019), clearly indicating that this someone should typically be a male. Van Leeuwen (2010, p. 46-47) categorizes this identification as “somatization” whereby “a reference to a part of [their] body” is made to impersonalize the social actor. This manner of impersonalization is a commentary on the nature of harassment that takes place in public transport as the target and the harasser are unknown to each other. The only way that the target can decipher the identity of the harasser is through his body parts. This nature, i.e., the non-specificity has allowed the harasser to continue to conceal himself from his crime.

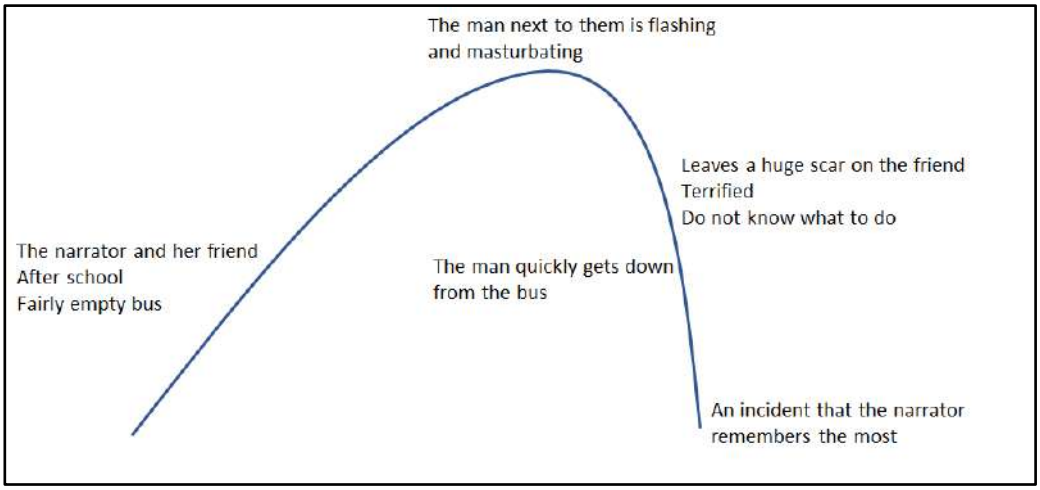
An interesting observation one could make in this regard is that the act of rubbing one’s genitals against the other’s back is called ‘jacking’ which is derived from the Sinhalese term /jæk gɑhɑnawɑː/. In Sinhalese, the term ‘jack’ is a direct borrowing from English which refers to the device that is used to lift motor vehicles. In a rather metaphorical sense, the jack thus becomes the phallus whereas the vehicle/ heavy object that is being lifted becomes the woman that is being harassed. Similar to the case of ‘gadget’ (See Narrative Analysis 2) the phallus is compared to a device and is thus objectivized.

The expressions such as ‘gadget’ and ‘jack’ convey the meaning ‘device’ which is the active force of a process. In this regard, the beneficiary is the social actor on whom the gadget is pressed against and/ or being jacked. These expressions that have been ingrained into the Sri Lankan lingo showcase the passivation of the target.

4.2.9. Narrative Analysis 9 (Vihangaa - Interview 4 - Narrative 1)

The significance of this narrative is that it is about two targets: the narrator and her friend who are two students going home after school. Although the narrator is unclear about their exact ages at the time of harassment it can be logically deciphered that they could be around 18 years of age or younger. In the narrative, (Figure 12) when the targets are travelling in the bus, the man who sits next to them is flashing his genitals and masturbating.

Figure 11: Narrative 1 by Vihangaa according to the narrative analysis model



The narrator depicts the loss of the friend's agency through her physical action of covering her face when the harasser is flashing and masturbating next to them.

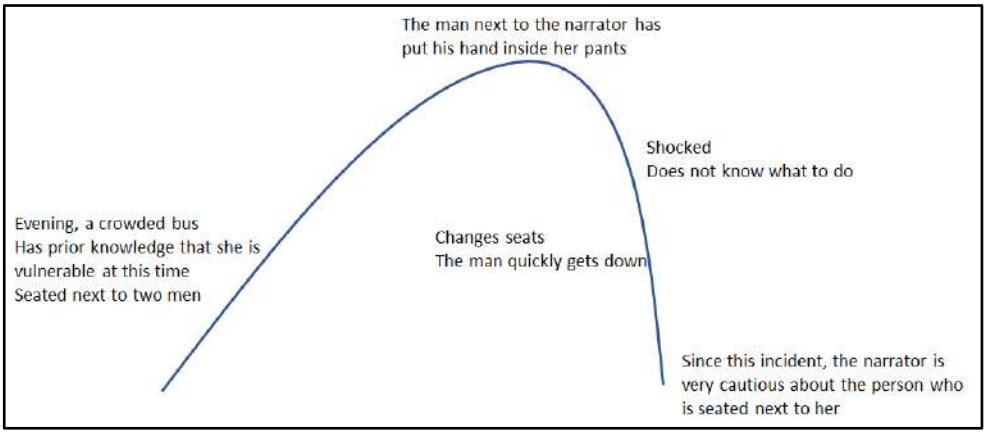
It can be argued that the narrator retains her agency, which could be deciphered from the way she evaluates the complicating action. Line 12 reads, "We were terrified, we were in school uniform, we didn't know what to do, we had no-one to talk to…" (Vihangaa, Personal communication, 25-08-2019): while this utterance contains negative emotions (i.e. "terrified") it also provides us with an evaluation of the state that the narrator and her friend wherein as a collective. Their physical agency has been threatened, being stranded in the corner of the seat of the bus; however, this narrator's evaluation and her repetitive use of the agent in the above utterance betray a retaining of her emotional agency even though she is being harassed. This observation is voiced out by the narrator in line 13, which reads "I think more than it affected me, it left a huge scar on my friend because I'm

guessing that was the first time, she experienced something like that…" (Vihangaa, Personal communication, 25-08-2019). In addition to the view that this line proves my previous position, it also points to the prior knowledge of the narrator and that it has led to desensitization of one's harassment.

4.2.10. Narrative Analysis 10 (Vihangaa - Interview 4 - Narrative 2)

This narrative deals with the way 'space' acts as a liberation from the harasser as well as an avenue of getaway for the harasser. In the narrative, the target falls asleep in the bus, and wakes up to see that the passenger who sits next to her has put his hand in her pants (See Figure 13).

Figure 12: Narrative 2 by Vihangaa according to the narrative analysis model



Source: Developed by Author

Further, as it has been noted in the Narrative Analysis 3, the incident in this narrative is an instance whereby the narrator slightly diverts from her usual routine. The narrator gets into the bus on a Friday evening which is unusual, because she usually avoids the 'long distance bus' during that hour because of her prior knowledge that the bus could be crowded and "things" could happen. Here the crowded has again been identified as the social space where GVPT takes place. As discussed in the analysis of the previous narrative, there is an implication that crowded buses back the harassers as they hinder the ability of the targets to move and defend themselves. The narrator seems to be aware of this as she usually avoids "crowded" buses. This is suggested by the narrator's association of the crowded buses with the possibility of 'things happening'.

It should be noted that the narrator states that she 'didn't have any other option but to get onto the bus (in which she got harassed). Here, her agency had already been compromised when she got on the bus. This is not necessarily the economic

discourse coming into play to threaten her agency as in the previous narrative, but also a particular culture of harassment that is built as a result of this discourse. This position can be taken because the narrator does not indicate a scarcity of buses in the previous narrative. She simply states that the buses are crowded during a given period which backs the harassers.

The realization of the narrator about her loss of agency can be seen when the narrator goes from, “I realized” to “I don’t know how it happened, I don’t know how he did that…” (Vihangaa, Personal communication, 25-08-2019). As the narrator wakes up and realizes that she is being harassed, the harasser also becomes “terrified” and stops the harassment.

In the above instance where the narrator seems to be regaining her agency, she is still unable to act in the way she wants to act. The narrative reads that she “stared…” (Vihangaa, Personal communication, 25-08-2019) at the harasser and she “wanted to slap him” but simultaneously, the narrator evaluates that “a part of her” did not do that. This can be connected to Narrative 3 whereby the narrator makes a similar observation that she was not able to act in the ‘expected’ way.

Thereby, the resolution of the narrative is the narrator switching places with a bystander i.e., changing her physical space. In the same way that changing of physical space helps the narrator, it aids the harasser to get away from being held accountable as he also gets down from the bus.

DISCUSSION AND FINAL REMARKS

The agency of the target

With the aid of WMatrix4 and by manually analyzing ten narratives of GVPT, three groups of people can be singled out: the targets, the bystanders, and the harassers. Furthermore, a constant engagement with the targets’ agency can be identified.

A significant factor that stands out in the analysis is that the agency of the target is already under threat when they take public transport. The orientation section of all the narratives concerns the targets’ prior knowledge and various safety precautions taken against potential harassment.

The male bystanders in the narrative could be divided into two categories: the male bystanders who are identified with the target and the male bystanders who are not identified with the target. The latter is backgrounded in the narratives. In all the narratives, female bystanders are radically excluded. While arguing this, it can be highlighted that the male bystanders who are identified by the targets with

themselves have a key role to play in determining whether the agency of the targets who are women is threatened or preserved.

What the above observations in the narratives convey is the dependency of the female users of public transport on their male counterparts to ensure that their agency is not invaded. The key point here is that the male is identified relationally. Interestingly, while a man who is unknown to the targets harasses them in public transport, another man who is known to them comes to the rescue. The women, whether they are being harassed or rescued, are at the receiving end, thus passivized.

Vera-Gray (2017, p. 73) develops on the existing literature that “women as a group are perceived as open persons in public spaces" a view that could be applied to the plight of the targets. In this context, all the harassers are not known to the targets; the only commonality between the targets and the harassers was the fact that they happened to physically be in the same mode of transport at the same time. The fact that the male harassers harass female targets who are unknown to them, and who they only saw during a brief period, clearly emphasizes the above view. The consideration of women thus, indicates that they lack agency in public transport.

In addition, the orientations of the narratives also pointed out that the targets note the crowdedness of the buses. In the ninth narrative, the narrator identifies that the bus is rather empty whereas in the tenth narrative and the eighth narrative, the targets note that the bus is rather crowded. The assumption that is upheld in the tenth narrative that less crowded buses are safer is debunked in the ninth narrative which was narrated by the same target. These myths about the crowdedness of the bus and the very fact that the targets were harassed irrespective of the crowdedness of the public transport show their vulnerability and the frantic want to hold on to their bodily agency.

The Involvement of the Dominant Discourses and Master Narratives

It is possible to consider counteracting GVPT an interdiscursive practice. The evaluation and the resolution of the narratives concern the instances whereby the target tries to regain her bodily agency by physically resisting the harasser or attempts to regain her agency metaphorically by seeking justice against the harassment. However, several factors hinder their ability to regain their agency.

Commenting on the incorporation of social media discourse as a means of resisting GVPT, B. Fileborn (2016, p. 1485) develops that there could be spaces where the targets “contest dominant social, cultural and legal narratives of sexual

violence" but that is open to debate. The target in the third narrative sought agency and justice by posting the story on Facebook; however, she was responded with a counter-narrative which is similar to the retort of the bus conductor in the first narrative. The target's attempt to turn the negative social media comments into a site of conversation may suggest the lack of space in Sri Lanka to hold a conversation on GVPT. Especially, in the third narrative, the target frames 'Colombo' as the space where conversations about GVPT are taking place. It leads to the question of the exclusion of the rest of the country which requires further scrutiny.

Thus far, the interferences of 'men' in determining the agency of women were discussed. Interestingly, this interference of the male is not restricted to a literal man but the patriarchal figure who is the breadwinner of the family. When one investigates the dominant socio-economic discourse concerning the woman's access to childcare without compromising her ability to work and be financially independent, the underlying patriarchal master narrative is clear. A point that was made earlier is shown in this context, which says that "the basic common character underlying women's experience of abuse is not always a male perpetrator, but rather the broader social meaning of the abuse that women are targeted because they are women" (Boyle, 2019. p. 23).

In essence, the findings of this research suggest a clear segregation of the female and male groups in Sri Lankan society. They also emphasize a strong need to ensure women's safety and to take necessary legal measures to apprehend the harassers. As noted, an unavoidable characteristic of GVPT is the anonymity of the harasser which hinders the ability to locate them once they have escaped. This nature coupled with patriarchal practices which are apparent signals for the necessity for the empowerment of passengers of public transport against harassment.

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Wasting Among School Children and Its Association in Nuwara-Eliya District, Sri Lanka

By R. M. L. Rathnayake[1]

ABSTRACT

The prevalence of child wasting is a leading issue of a child's physical and mental development. Wasting is assessed by measuring the Weight for Height (WFH) Z score. WFH is a measure of acute or short-term exposure to a negative environment and is one of the major three forms of undernutrition. Identifying the different relationships with wasting is important in the attempt to drop the prevalence of wasting to achieve an effective nation through well-nourished children. The objective of this study is to identify the associations between wasting among schoolchildren and different phenomena in Sri Lanka based on the Nuwara-Eliya district. A sample survey was conducted to collect data using a structured questionnaire in this study. Three hundred seventy-eight (378) schoolchildren studying in grade 6 (11 years old) were selected for the study. Multistage stratified random sampling was employed as the sampling technique. Wasting was measured using the Weight for Height (WFH) Z score using SPSS software. A parametric statistical test, the t-test and a non-parametric statistical test, the chi-square test was applied in the study in investigating the relationships. A chi-square test was applied to find out the relationships between wasting and categorical variables. For the relationship between wasting and continuous variables, a t-test was employed. In addition, descriptive statistics were applied in data analysis. A study found that the percentage of children suffering from wasting is 27.5%. The incidence of wasting is more related to low-income families, poverty, mothers working in the private sector, female children, families with more children, young mothers, no-schooling mothers and never married parents because of their higher prevalence of wasting than other groups. Thus, the study suggests an urgent need for more effective policies targeting to decrease the high prevalence of wasting among the children who belonged to these groups.

KEYWORDS: Gender, Income, Mother's Employment, Poverty, Wasting

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INTRODUCTION

Child wasting is a leading public health problem in many developing countries. Child undernutrition includes wasting, stunting, and being underweight (WHO, 2023). Wasting is one of these major three forms of undernutrition and low weight-for-height is known as wasting (Casadei, K, & Kiel, J., 2021). Weight-for-height (WFH) indicates an energy balance, as weight can be lost or gained relatively quickly. WFH is a measure of acute or short-term exposure to a negative environment. It is sensitive to changes in calorie intake or the effects of disease. Wasting is contributing to child morbidity and mortality among under-5-year-old children mostly in many developing countries (Yassin et al., 2016). World Health Organization (WHO) and other health authorities commonly recommend anthropometric methods to assess nutritional status (Bates et al., 2017). Widely used anthropometric indices available to assess the nutritional status of children are Weight for Age (WFA), Height For Age (HFA), Weight For Height (WFH), Body Mass Index (BMI), Mid Upper Arm Circumference (MUAC), Weight at Birth (Casadei and Kiel, 2021). By measuring the Weight for Height, it can be determined if children are wasting. According to WHO, a child is considered wasted and severely wasted if the WFH Z score falls below minus two standard deviations (<-2SD) and minus three standard deviations (<-3SD) of the WHO child growth standard median, respectively (WHO, 2010).

UNICEF/WHO/World Bank Group (2021) stated that in 2020, globally, 45.0 million children under five were affected by wasting.

As given in Table 1, considering WHO regions, the wasting rate among children under five years is the highest (14.5%) in the heavily populated Southeast Asia region. Considering the income categories, the highest percentage of wasting is perceived in lower-middle-income countries (9.9%) while showing the lowest percentage (0.4%) for the high-income countries. Regarding South Asian countries, wasting is the highest in India (17.3%), while the second place has gone to Sri Lanka (15.1%). More than half of all children suffering from wasting worldwide are found in South Asia (UNICEF/WHO/WB, 2021), including Sri Lanka.

Table 1: Child wasting by WHO Regions and different categories of countries in 2020

WHO Regions			
Regions	**Wasting %**	**Regions**	**Wasting %**
African Region	5.8	Eastern Mediterranean Region	7.4
Region of the Americas	0.7	Europe Region	-
South-East Asia Region	14.5	Western Pacific Region	2.1
World Bank Income categories			
Type of Country	**Wasting %**	**Type of Country**	**Wasting %**
Low income	6.9	Upper middle income	2.1
Middle Income	6.8	High income	0.4
Lower-middle income	9.9		
South Asia Countries			
Country	**Wasting %**	**Country**	**Wasting %**
Afghanistan	5.1	Bhutan	5.9
Bangladesh	9.8	Pakistan	7.1
India	17.3	Sri Lanka	15.1
Nepal	12		

Source: UNICEF / WHO / World Bank Group, 2021

Table 2 indicates the prevalence of severe wasting (% below -3 SD) and wasting (% below -2 SD) among children under five years old for three main residential sectors in Sri Lanka. Severe wasting measured through a WFH Z score below -3 SD is the highest (3.7%) in the estate sector (DCS, 2017). The prevalence of waste assessed by WFH Z score below -2 SD is 11.8% in Nuwara Eliya district (DCS, 2017).

Table 2: Child Wasting in Sri Lanka by Residential Sector

Residential Sector	Wasting (Weight for Height)		
	% below -3 SD	% below -2 SD	Mean Z score
Urban	1.6	12.9	(-0.7)
Rural	3.2	15.6	(-0.9)
Estate	3.7	13.4	(-0.9)

Source: DCS, 2017

Table 3: Percentage of Population in the Estate Sector by District

District	Estate Sector (%)	District	Estate Sector (%)
Colombo	0.4	Badulla	18.4
Gampaha	0.1	Monaragala	1.7
Kalutara	3.2	Rathnapura	9.3
Kandy	5.9	Kegalle	6.6
Matale	2.5	Jaffna	-
Nuwara-Eliya	53.2	Mannar	-
Galle	1.9	Vavunia	-
Matara	2.9	Mullaitivu	-
Hambantota	-	Kilinochchi	-
Kurunegala	0.5	Batticaloa	-
Puttalam	0.2	Ampara	-
Anuradhapura	-	Trincomalee	-
Polonnaruwa	-	Total	4.4

Source: DCS, 2012

As evident from Table 3, the latest census of population and housing in Sri Lanka has shown that the percentage of population in the estate sector is the highest (53.2%) in the Nuwara-Eliya district (DCS, 2012). The highest prevalence of severe wasting was recorded for the estate sector, while the highest percentage

of estate population was recorded for the Nuwara-Eliya district. Therefore, Nuwara-Eliya district was selected as the study area for this study.

The prevalence of child wasting is a leading issue of a child's physical and mental development. The children suffering from waste are critical to the future labour supply in the country. Unhealthy children being wasted is a crucial barrier in the development process of the country through inefficient labour supply. Identifying the different relationships with wasting is important in the attempt to drop the prevalence of wasting to achieve an effective nation through well-nourished children. Many researchers in the world, including Sri Lanka, have conducted research on wasting in different aspects. However, it has not been comprehensively documented on wasting and its relationships among schoolchildren in the Sri Lankan context. The objective of this study is to identify the associations between wasting among schoolchildren and different phenomena in Sri Lanka based on the Nuwara-Eliya district.

LITERATURE REVIEW

In 1977, Waterlow defined wasting with the recommendation of using Weight-For-Height (WFH) z-scores and SDs (standard deviation) below the median (Waterlow et al., 1977). Later, measurement of wasting based on WFH was continued to be used widely with successive WHO amendments.

Child wasting and its association have been examined by many previous studies. Danso and Appiah (2023) have conducted a study on prevalence and associated factors influencing stunting and wasting among children. They have found that non-working or jobless parents have a higher possibility of their children suffering from wasting or stunting. Further, fathers' education, age of child, and birth interval were also found to be significant factors associated with wasting and stunting. According to Jayatissa et al. (2023), the percentage of children suffering from wasting is 14% and 21.4% among children aged 1-4 years and aged 5-9 years, respectively, during the COVID-19 pandemic in Sri Lanka. They revealed an absence of a significant difference between male and female with wasting among children. Further, they found that there was not an association between wasting and dietary intake. A significant association was derived between wasting and low family socioeconomic status (Tsedeke et al., 2016). According to Getaneh et al. (2019), children in lower socioeconomic classes were more likely to suffer from wasting than those who were in upper socioeconomic classes. A significant association was observed between family income and wasting, indicating that having a family income below 4000 BDT (~$50) significantly increased the risk for wasting among Adivasi children aged 24–59 months in

Bangladesh (Kabir et al., 2018). High family income lowers the risk of wasting (Roobiati et al., 2019). Wasting among the children of low family income is higher than their counterpart (Yassin et al., 2016). Ayana et al. (2015) found that wasting was significantly associated with household monthly income. Khan and Mohanty (2018) suggested that the poverty of households was a strong and significant predictor of wasting. A significant association was found between higher wasting and low family wealth (Li et al., 2020). According to Getaneh et al. (2019), children in lower wealth index were more likely to be wasted than those who were in upper socioeconomic class. Food expenditure of the family is a related factor for wasting (Li et al., 2022). Ayana et al. (2015) found that wasting was significantly associated with paternal occupation. Das and Gulshan (2017) found that a mother's occupation as physical labour was a key factor for wasting. Ubeysekara et al. (2015) observed that wasting was higher among children whose mothers are unemployed than the employed mothers.

Many studies have investigated the relationship between wasting and maternal status. A significant association was found between wasting and maternal educational level (Li et al., 2020). Wasting among the children of low educated mothers is higher than their counterparts (Yassin et al., 2016). High maternal education is lowering the risk of wasting (Roobiati et al., 2019). Higher wasting is significantly associated with short maternal height and low BMI of mothers (Li et al., 2020). Mothers' age less than 20 years is associated with wasting (Pediatr, 2008). With respect to the child's status, female children are more likely to be wasted than male children (Tsedeke et al., 2016). Low birth weight is associated with wasting (Pediatr, 2008). Normal birth weight is lowering the risk of wasting (Roobiati et al., 2019). The incidence of wasting was highest among children aged between 48 and 60 months (Tsedeke et al., 2016). Wasting among the children who breastfed ≤12 months is higher than the others (Yassin et al., 2016). Good nutritional intake is lowering the risk of wasting (Roobiati et al., 2019). Respiratory and gastrointestinal infections increase wasting (Yassin et al., 2016). Small family size is lowering the risk of wasting (Roobiati et al., 2019). The prevalence of wasting is low among the children coming from rural sectors (Li et al., 2020). Higher prevalence of wasting is associated with children's cognitive delay in countries with low income and middle income (Emerson et al., 2020).

METHODOLOGY

A quantitative research approach with primary data collected through a sample survey was applied in this research. Sample survey data were collected using a structured questionnaire in this study. Three hundred seventy-eight (378) schoolchildren studying in grade 6 (11 years old) were selected for the study. Multistage stratified random sampling was employed as the sampling technique. At the first stage, Nuwara-Eliya district from 25 districts in Sri Lanka was decided as the study area due to the highest prevalence of severe wasting in the estate sector (DCS, 2017) and the highest percentage of estate population in the Nuwara-Eliya district (DCS, 2012). In the Sri Lankan educational system, the government schools are divided into four categories: Type 1AB, Type 1C, Type 2, and Type 3 (Ministry of Education, 2019). Only three types of schools, type 1AB, type 1C, and type 2, which hold grade 6 classes, were used as the first strata to draw the sample and from each, three schools were selected for the sample randomly. In the next stage, both male and female children of grade 6 classes of selected schools were selected proportionately to the sample. A sample was distributed for each selected school proportionally, representing both male and female and the total sample size of 378 was decided based on the Morgan table. The ethical approval to conduct this research was obtained from the ethics review committee at the University of Kelaniya, Sri Lanka and they agreed not to reveal the individual identities of both children and schools.

The incidence of child wasting, and its classifications were based on global standards: <−3 z score, <−2 z score, and ≥−2 z score (WHO, 2017). Wasting was measured using the Weight for Height (WFH) Z score using SPSS software.

The index was calculated using the following formula: .

The formula to obtain the WFH z score is

$$WFH\ Z\ Score = \frac{M_0 - M_e}{SD_e}$$

Where,

$$M_o = Observed\ Weight\ of\ an\ individual\ in\ a\ given\ Height$$

$$M_e = Median\ Weight\ of\ the\ reference\ population\ in\ a\ given\ Height$$

$$SD_o = Standared\ deviation\ of\ reference\ population\ in\ a\ given\ height$$

Table 4: Classification of Wasting

Weight-for-Height z-score	Classification
$Z-score \geq -2$	Well nourished
Z-score < - 2	Wasted
Z-score < - 3	Severely wasted

Source: Namakin et al., 2014

Children with a WFH z score below −2 SD of the median of the reference population were considered as wasted and others are not wasted as given in Table 4 (Namakin et al., 2014). The other phenomena considered to investigate associations with wasting are income, expenditure, poverty, mother's employment, father's employment, gender, number of children in the family, mother's age, mother's occupation, and marital status. These phenomena are used as continuous variables and categorical variables. Income and expenditure are total monthly family income and expenditure and were used as continuous variables. However, they were later categorized in graphical representation. Poverty, mother's employment, father's employment, gender, number of children in the family, mother's age, mother's occupation, and marital status were used as categorical variables. Poor and non-poor status was decided based on the entitlement for Samurdhi. Both the parametric statistical test and the non-parametric statistical test were used to investigate relationships. The t-test and Chi-square test are the parametric and non-parametric statistical tests, respectively, applied in the study.

For the relationship between wasting and continuous variables, a t-test was employed. It is given by,

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\left(\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}\right)\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}$$

Where,

$n_1 and\ n_2\ are\ total\ number\ of\ subjects\ for\ groups\ one\ and\ two\ respectively.$
$\bar{x}_1 and\ \bar{x}_2\ are\ the\ sample\ means\ for\ groups\ one\ and\ two\ respectively$

$s_1^2 and\ s_2^2\ are\ the\ varianecs\ for\ groups\ one\ and\ two\ respectively.$

Chi-square test was applied to find out the relationships between wasting and categorical variables. It is given by,

$$\mathcal{X}^2 = \sum \left[\frac{\left(o_{ij} - e_{ij}\right)^2}{e_{ii}} \right] \sim \mathcal{X}^2_{(c-1)(r-1)}$$

Where,

$$o_{ij} = Observed\ cell\ count\ in\ the\ i^{th}\ row\ and\ j^{th}\ coloumn\ of\ the\ tables$$

$$e_{ij} = Expected\ cell\ count\ in\ the\ i^{th}\ row\ and\ j^{th}\ coloumn\ of\ the\ tables$$

$$e_{ij} = \frac{i^{th}\ row\ total * j^{th}\ column\ total}{Grand\ total}$$

In addition, Kolmogorov-Smirnov and Q-Q plots for normality, descriptive statistics, percentages, tables, bar chats, pie charts were applied in data analysis. It is required to satisfy normality assumption for continuous variables prior to use parametric techniques for finding relationships among continuous variables. Therefore, normality assumption was checked for monthly family income and monthly family expenditure since they are continuous variables.

RESULTS AND DISCUSSION

The primary data collected from a sample of 378 grade 6 school children selected from government schools in the Nuwara-Eliya district, Sri Lanka was analyzed in this study.

SAMPLE DISTRIBUTION

The sample distribution with respect to the type of school, living sector, gender, race and, and religion is presented in the table 5.

Table 5: Sample Distribution

Characteristic	Categories	Number of children	Percentage (%)	Total
Type of school	Type 1AB	141	37	378
	Type 1C	140	37	
	Type 2	97	26	
Living Sector	Rural	258	68	378
	Urban	80	21	
	Estate	40	11	
Gender	Male	207	55	378
	Female	171	45	
Race	Sinhala	271	72	378
	Tamil	93	24	
	Muslim	7	2	
	Burger	7	2	
Religion	Buddhist	263	70	378
	Hindu	81	21	
	Islamic	7	2	
	Catholic	27	7	
Poverty	Poor	69	18	378
	Non-poor	309	82	

Source: Sample survey data analysis, 2023

As shown in the table 5, type 1AB and type 1C schools have similar representation (37%) in the sample while least representation was by type 2 schools (26%). Considering the residential sector, the majority of the children (68%) in the sample have lived in the rural sector while the least percentage of children have come from the estate sector. The urban sector representation in the sample was 21% recording the second place. Male representation (55%) of the sample is higher than the female representation (45%). Considering the race, the highest, 72% of the sample consists with Sinhalese while the lowest with Muslims and Burgers (2%). Regarding the religion, the highest percentage (70%) of the

sample was recorded form Buddhist religion group. The lowest percentage (2%) of the sample was represented by Islamic children. The percentage of children from poor families is 18 and non-poor families is 82 based on having or not having Samurdhi.

PREVALANCE OF WASTING

Table 6: Prevalence of Wasting in the Sample

Wasting	Number of children	Percentage (%)	Total
Suffering from Wasting	104	27.5	378
Not Suffering from Wasting	274	72.5	

Source: Sample Survey Data Analysis, 2023

Table 6 revealed that the percentage of children suffering from wasting is 27.5% while the percentage of children not suffering from wasting is 72.5%. According to the Department of Census and Statistics (Dwas (2017), 11.8% of children (for under-five year children) have suffered from wasting, which were measured through the WFH z score for the Nuwara-Eliya district. The prevalence of wasting under this study is higher than the percentage given by DCS in 2017.

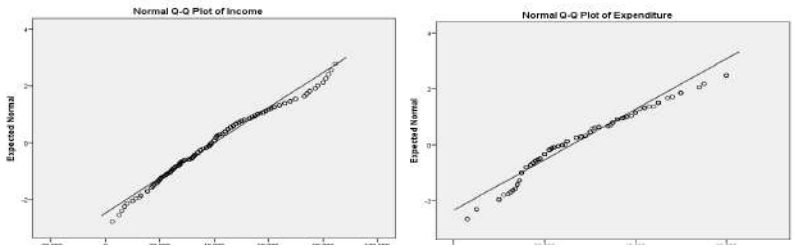
Table 7: Kolmogorov-Smirnov test for Normality

Variables	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Income	0.082	378	0.053	0.978	378	0.05
Expenditure	0.096	378	0.05	0.985	378	0.049

a. Lilliefors Significance Correction

Source: Sample Survey Data Analysis, 2023

Figure 1: Q-Q Plot for Normality



Source: Sample Survey Data Analysis, 2023

Table 7 shows the test statistic and its significance value for Kolmogorov-Smirnov test for normality. It is greater than 0.05 and equal 0.05 for income and expenditure respectively indicating the normal distribution of these variables. Further, as shown in figure 1, Q-Q plots revealed that normality assumption is satisfied for the variables, income and expenditure. Therefore, t test was applied to check the relationship between wasting and two continuous variables, income and expenditure.

Table 8: Result of t-test and Chi-square test

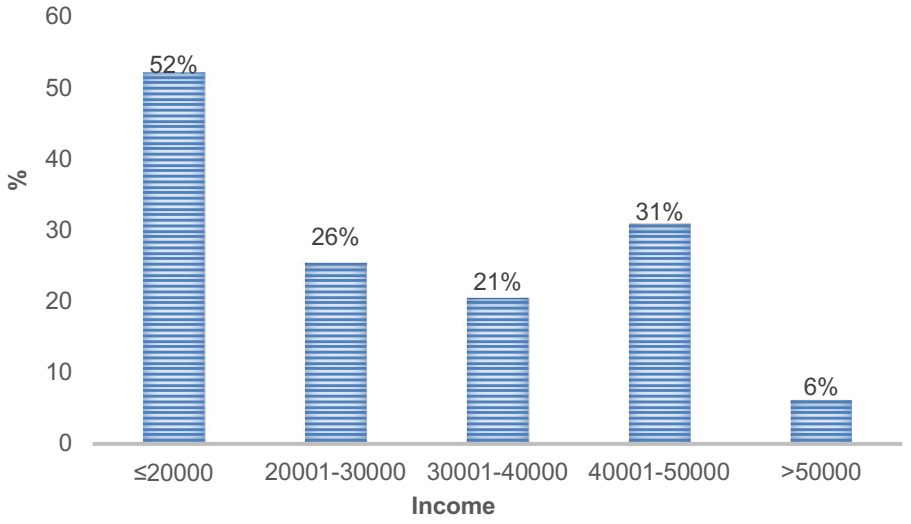
Variables	Wasting	Variables	Wasting
Income	t test (p value=0.004)	**Gender**	Chi-Square (p value=0.035)
Expenditure	t test (p value=0.061)	**Number of Children**	Chi-Square (p value=0.049)
Poverty	Chi-Square (p value=0.048)	**Mother's Age**	Chi-Square (p value=0.035)
Mothers' Employment	Chi-Square (p value=0.042)	**Mother's Education**	Chi-Square (p value=0.002)
Father's Employment	Chi-Square (p value=0.051	**Marital Status**	Chi-Square (p value=0.050)

Source: Sample Survey Data Analysis, 2023

According to Table 8, the t test proves that the family income and the wasting have a statistically significant relationship at the 0.01 level. Supporting this result,

Ayana et al. (2015) found that wasting was significantly associated with household monthly income.

Figure 2: Prevalence of Wasting by Income

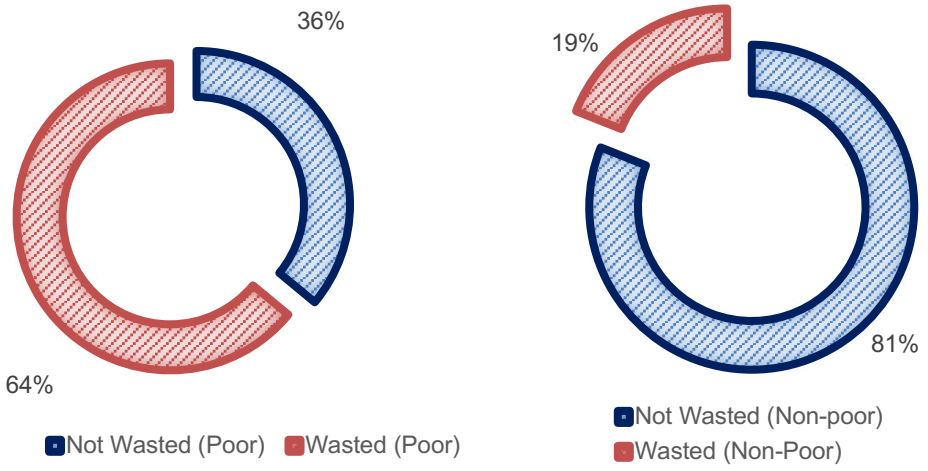


Source: Sample Survey Data Analysis, 2023

Figure 2 shows a negative relationship between wasting and income categories. The highest percentage of wasting, 52%, is recorded for the lowest income group, less than 2000, while it is lowest (6%) in the highest income group, more than 5000. Agreeing with this, Roobiati et al. (2019) observed that high family income lowers the risk of wasting. Wasting among the children of low family income is higher than their counterpart (Yassin et al., 2016). Kabir et al. (2018) observed a significant association between family income and wasting, indicating that having a family income below 4000 BDT (~$50) significantly increased the risk for wasting among Adivasi children aged 24–59 months in Bangladesh.

Considering expenditure, Table 8 showed that the value of the t-test (0.061) is greater than 0.05, indicating an absence of significant association with wasting. In contrast, Li et al. (2022) illustrated that food expenditure of the family is a related factor for wasting.

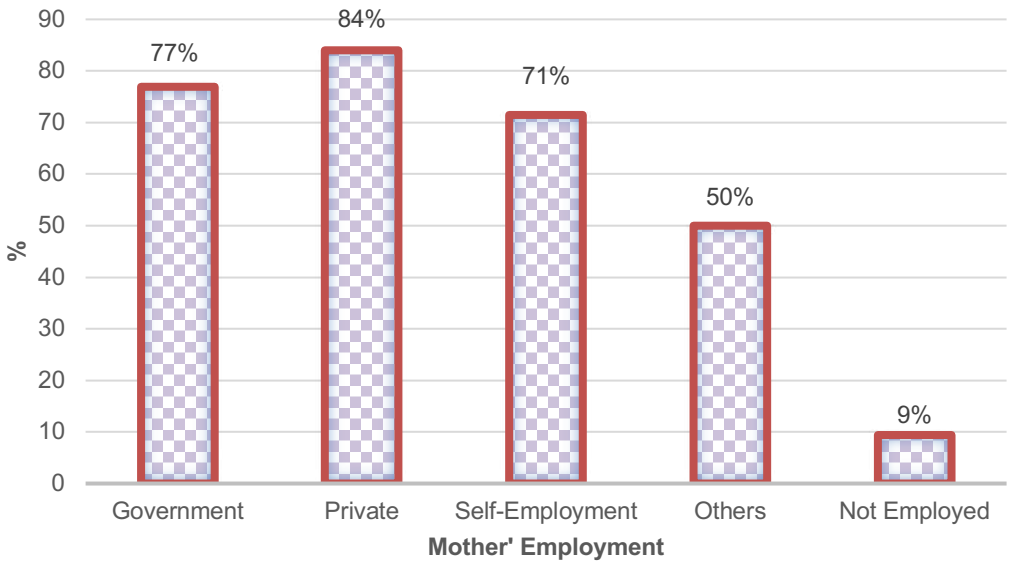
Figure 3: Prevalence of Wasting by Poverty



Source: Sample Survey Data Analysis, 2023

As given in Table 8, the chi-square value provides that poverty is statistically related to wasting at the 0.05 significance level. Similarly, Tsedeke et al. (2016) observed that the children coming from poor households were significantly associated with wasting. As shown in Figure 3, a big difference in child wasting exists between poor children and non-poor children. Child wasting is more common among poor children than non-poor children, indicating that 64% of poor children and 19% of non-poor children are suffering from wasting. It is evident that for the poor group, the percentage of wasted children is higher than the percentage of non-wasted children and the opposite is seen among the non-poor.

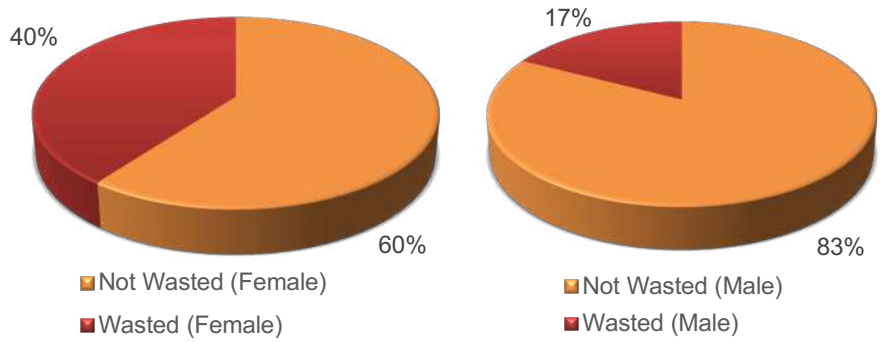
Figure 4: Prevalence of Wasting by Mother's Employment



Source: Sample Survey Data Analysis, 2023

The result of the chi-square test, given in Table 8, proves that the mother's employment and wasting have a statistically significant relationship at the 0.05 level. Supporting this result, Das and Gulshan (2017) found that a mother's occupation was a key factor for wasting. Figure 4 highlights that the highest percentage of child wasting (84%) is seen among children whose mothers work in the private sector. The second place has gone to the children whose mothers work in the government sector. Wasting has appeared to be the lowest among the children with mothers who are never employed (9%). Further, a considerable percentage of children with mothers involved in self-employment (71%) are suffering from wasting. In contrast, Ubeysekara et al. (2015) observed that wasting was higher among children whose mothers are unemployed than the employed mothers.

Figure 5: Prevalence of Wasting by Gender



Source: Sample Survey Data Analysis, 2023

According to the table 8, chi-square proves that the gender and the wasting have a statistically significant relationship at 0.05 level. Figure 5 shows that the incidence of child wasting is different with respect to the children being a male or female. The female children are more likely to expose to wasting than the male children. Similarly, according to Tsedeke et al. (2016), female children are more likely to be wasted than male children. Also, this study reveals that 40% of the females and 17% of the males of the sample are suffering from Wasting. Based on the demographic and health survey report, the percentage of wasting (National) among under five-year children for males is 15.4% (DCS, 2017). However, the prevalence of wasting found in this study using the sample drawn from Nuwara-Eliya district for males (17%) is slightly close to the results (15.4%) for male (under five-year children) for overall-Sri Lanka computed by DCS (DCS, 2017). According to the DCS, the percentages wasting (National) among under-five year children for females are 14.7% (DCS, 2017). Regarding female, the percentage suffering from wasting computed using the sample drawn from Nuwara-Eliya district (40%) is higher than that for overall Sri Lanka (14.7%) (under five-year children) provided by DCS (DCS, 2017). Considering national figures, wasting among under five-year children is appearing a little higher among males (15.4%) than female (14.7%).

Table 9: Prevalence of Wasting by Different Variables

Variable	Categories	Wasted %	Not Wasted %
Number of children	1	40	60
	2-3	20	80
	4-5	22	78
	>5	67	33
Mother's age in years	≤30	35	65
	31-35	45	55
	36-40	25	75
	41-45	15	85
	46-50	27	73
	>50	20	80
Mother's education	No schooling	71	29
	Primary	33	67
	Secondary	18	82
	Tertiary	48	52
Marital status	Married	27	73
	Divorced/Separated	16	84
	Widowed	43	57
	Never married	80	20

Source: Sample Survey Data Analysis, 2023

Chi-square, as given in Table 8, proves that the number of children in the family and wasting have a statistically significant relationship at the 0.05 level. Table 9 revealed that the percentage of suffering from wasting is the highest (67%) among the children of families with more than five children. The least percentage of (20%) wasting is recorded for the family group with the number of children being 2 or 3. Supportively, Roobiati et al. (2019) found that small family size lowered the risk of wasting.

According to the chi-square given in Table 8, mother's age and wasting have a statistically significant relationship at the 0.05 level. Table 9 shows the percentages of wasted children by mother's age. The highest child wasting was found at 45% for the age group of 31-35 years. For the first two age groups (≤30, 31-35), the percentage of child wasting is higher than the other age groups. The percentage of children suffering from wasting is lowest (15%) for the 41-45 age group. It is obvious that young mothers are more likely to have malnutrition for their children than their counterparts. According to Tsedeke et al. (2016), considering children's age, the incidence of wasting was highest among children aged between 48 and 60 months.

Table 8 shows that a mother's educational level and wasting are statistically related based on the chi-square test. Agreeing with this, Li et al. (2020) found a significant association between wasting and maternal educational level. As shown in Table 9, regarding the mother's educational level, the highest prevalence of wasting (71%) appeared among the children whose mothers had no schooling. Similarly, wasting among the children of low-educated mothers is higher than their counterparts according to Yassin et al. (2016). High maternal education lowers the risk of wasting (Roobiati et al., 2019). According to Table 8, for the mothers with tertiary education, 48% of the children suffer from wasting, recording the second place. The lowest wasting (18%) is seen among the children of mothers who had secondary education.

Considering the marital status, Table 8 shows that it is statistically related to wasting based on the chi-square test. Table 9 reveals that the percentage of suffering from wasting is the highest (80%) among the children of parents who have never married. The second place has gone to the children belonging to widowed families, recording 43% of wasted children. The percentage of children suffering from wasting is low among children with parents who are divorced/separated (16%) and married (27%) relative to the children with never-married parents.

CONCLUSION

This research study was conducted to identify the relationships between socio-economic and demographic status and the prevalence of wasting among schoolchildren in the Nuwara-Eliya district, Sri Lanka. Both quantitative and qualitative data were gathered through a sample survey. Three hundred seventy-eight (378) schoolchildren were selected for the study. Multistage stratified random sampling was employed as the sampling technique. The incidence of child stunting and its classifications were based on global standards: <−3 z score,

<−2 z score, and ≥−2 z score (WHO, 2017). Wasting was measured using the Weight for Height (WFH) Z score, a chi-square test was applied to find out the relationships between wasting and categorical variables. For the relationship between wasting and continuous variables, a t-test was employed. In addition, descriptive statistics, percentages, tables, bar charts, and pie charts were applied in data analysis.

Considering the sample distribution, male representation of the sample (55%) is higher than female representation (45%). Type 1AB and type 1C schools have similar representation (37%) in the sample, while the least representation was by type 2 schools (26%). Considering the residential sector, the majority of the children (68%) in the sample have lived in the rural sector. The percentage of children suffering from wasting is 27.5%, which was measured through the WFH Z score. Family income and wasting have a statistically significant relationship at the 0.01 level, while family expenditure is not significant. The highest percentage of wasting, 52%, is recorded for the lowest income group, less than 2000, while it is lowest (6%) in the highest income group, more than 5000. The chi-square value provides that poverty is statistically related to wasting at the 0.05 significance level. Child wasting is more common among poor children (63%) than non-poor children (19%). According to the chi-square test, mother's employment and wasting have a statistically significant relationship at the 0.05 level. The highest percentage of child wasting (84%) is seen among children whose mothers work in the private sector. Based on the chi-square test, gender and wasting have a statistically significant relationship at the 0.05 level. Female children are more likely to be exposed to wasting (40%) than male children (19%). A chi-square test found that the number of children in the family, mother's age, mother's educational level, marital status, and wasting are statistically significantly associated. The percentage of suffering from wasting is the highest (67%) among the children of families with more than five children. The highest child wasting was found at 45% for the mother's age group of 31-35 years. The highest prevalence of wasting (71%) appeared among the children whose mothers had no schooling. The highest percentage of wasting (80%) was evident among the children of parents who had never married.

It is concluded that more concern should be placed on low-income families, poverty, mothers working in the private sector, female children, families with more children, young mothers, no-schooling mothers, and never married parents because of their high prevalence of wasting compared to other groups. Thus, the study suggests an urgent need for more effective policies targeting a decrease in the high prevalence of wasting among the children who belong to these groups.

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Determinants of women's labour force participation and wages in the agricultural sector: Evidence from Anuradhapura District

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ABSTRACT

The main objectives of the study are to examine how the demographic and socio-economic characteristics influence women's participation in the agricultural sector and how these factors determine the wages in the sector in Anuradhapura district. Cross-sectional data were collected from 3 villages in the Talawa Divisional Secretariat in the district, and from these villages, 175 rural women were selected randomly in 2022. Results of frequency showed that 66% of the women participated in the agricultural sector, and 34% of them did not participate. The Heckman selection model was applied in two stages, and in the first stage, the Probit regression model was used to identify the impact of demographic and socio-economic characteristics on women's labour supply. In the second stage, the ordinary least square method was applied to identify the factors influencing wages in the agriculture sector in the study. Determinants of women's labour supply in the Probit model found to be age, age squared, credit accessibility, opportunity of getting another job, level of education, and other income sources, while the number of children and husband's occupation were found to be insignificant as a determinant of women's labour force participation in the model. Results of the ordinary least square method suggested that education, farm experience, and experience squared were significantly influencing the wage in the agricultural sector in the district.

KEYWORDS: Credit Accessibility, Demographic Characteristics, Heckman Selection Model, Women's Participation.

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INTRODUCTION

The agriculture sector plays a vital role in Sri Lanka, contributing 7.3% to the country's GDP, accounting for 21.8% of total export earnings, and employing 27.3% of the national workforce (Central Bank of Sri Lanka, 2021). According to the Department of Census and Statistics (2022), nearly all secondary employment in the agriculture sector falls within the informal sector, with 97.9% being informal workers. The mean monthly income for wage earners in the agricultural sector is LKR 28,611, while daily wage earners earn an average of LKR 23,081 (Department of Census and Statistics, 2022). Furthermore, the Agricultural Household Survey for 2016–2017 reports that there are a total of 170,323 agricultural households in the Anuradhapura district (Department of Census and Statistics Sri Lanka, 2017). Paddy cultivation is a significant sub-sector of agriculture, with the total paddy production in 2019/2020 reaching 153,207,000 bushels and the highest yield coming from the Anuradhapura district, accounting for 25,418,000 bushels (Census and Statistics Department, 2021).

Given that approximately 82% of all households in Sri Lanka are in rural areas (International Fund for Agriculture Development, 2015), the rural population heavily relies on agricultural activities. The Anuradhapura district, being predominantly rural, sees a high participation of its residents in agriculture-related activities. This region boasts numerous paddy fields, tanks, lakes, and chena (shifting cultivation) areas. The residents engage in various agricultural tasks, including land clearing, tilling, planting, weeding, applying fertilizer or manure, harvesting, food processing, and livestock management. Notably, 51.9% of the employed population in the Anuradhapura district is involved in the agriculture industry group. In terms of gender representation, 51.8% of males and 52.2% of females in the district are engaged in the agriculture sector (Department of Census and Statistics, 2022). This demonstrates the significant contribution of female labour to the agriculture sector in the Anuradhapura district.

Therefore, it is imperative to conduct a study on women's labour force participation and wages in the agriculture sector in the Anuradhapura district. This study, therefore, seeks to shed light on the factors affecting women's participation and wages in the Anuradhapura District's agricultural sector, which plays a crucial role in Sri Lanka's paddy harvest while also filling a notable research gap in the region on this subject. Furthermore, this research addresses an important economic issue and provides valuable insights for government agencies and

other stakeholders interested in formulating policies related to female labour force participation and wages in the agriculture sector.

In this background, there are two research questions that need to be answered, focusing on how demographic and socio-economic characteristics influence the probability of women's participation and how those factors determine the wages in the agricultural sector in Anuradhapura district. Based on these research questions, this study intends to achieve the following two objectives:

- To identify how demographic and socio-economic characteristics influence the probability of women's participation, whether they participated or not in the agricultural sector in Anuradhapura district.
- To analyze how the socio-economic characteristics determine the wages of women in the above study area.

LITERATURE REVIEW

Early theoretical literature relating to women's workforce participation derives from the standard neoclassical model (Blundell and MaCurdy 1999) and focuses on the role of the expected market wage. The theory predicts that an increase in the expected wage, given local market conditions and an individual's human capital, can either increase or decrease the supply of an individual's labour depending on the combined effect of the income and substitution effect. The individual may want to work less because she can enjoy more leisure for the same amount of work (income effect), or she may want to work more because she can earn more with a higher wage (substitution effect). The income effect can also work at the level of the household: the individual may no longer need to work if other household members are working or experience a wage increase.

The U-shaped female participation curve hypothesizes that the agricultural sector is the dominant sector for female and male employment in developing countries, and women are economically active due to the large number of employment opportunities in the agricultural sector, and female labor force participation rates are high. During the process of development, especially at the initial stages of economic development, home-based production patterns change to market-oriented production patterns. Market-oriented activities dominate home-based production; henceforth, the expansion of market-oriented activities or the introduction of new technologies lead to a decrease in female labor force participation. After a certain point, economic development requires more female labor, and demand for female workers will increase. Hence, female labor force participation will increase (Goldin, 1995). For example, women's labour force

participation may be high in agricultural economies where women work on family-owned farms. With industrialization, men find jobs in manufacturing in cities as they are relatively better educated. Their wives withdraw from the labour market to preserve the household's newfound social status and because they cannot get jobs commensurate with that social status given their lower skill endowment. But women's labour force participation rises again as a growing service sector expands white-collar job opportunities, which women, who are now better educated, can take up. Thus, before industrialization, poorly educated women were forced to combine farm work with care work, and better education may not increase labour force participation if the jobs available are not commensurate with the social aspirations fueled by more schooling. However, further education may enable women to get jobs in higher-skilled occupations, which further validate the household's higher social status and make it acceptable for them to work.

In the case of females, age is intricately linked with fertility and childbearing years, making marital status and the ratio of dependent children also influential factors at the individual level that impact the decision to participate in the labour force (Gupta, 2023).

In India, Gupta (2023) focused on examining the factors influencing female labour force participation between 2005 and 2019. The findings derived from probit regression analysis show women's age, educational attainment, marital status, the presence of children, household size, the socioeconomic status of the household, and the type of occupation will impact female labour force participation. In Sri Lankan context, (Siyama & Samaraweera, 2021) examined the factors influencing labour force participation among married women, with a specific focus on ethnicity, using a binary logistic regression model. Using data from the 2018 Sri Lankan Labour Force Survey, the study revealed that ethnicity played a significant role in shaping married women's labour force participation. Sinhalese, Sri Lankan, or Indian Tamil females are more likely to engage in the labour market, whereas married women from the Moor community are less likely to participate due to their strong adherence to traditional and cultural norms. The study also identified other influential factors, including the husband's employment and occupational sector, age of children, family income, the woman's age, residential sector, province, disability, vocational training, and digital literacy. A study conducted by (Amarathunga et al., 2022) used a sample of 387 women based on Mogen's table and employed an explanatory research approach to study determinants of female labour force participation in Sri Lanka. The findings highlighted that educational qualifications, marital status, and access to various income sources significantly influenced female labour force participation in Sri

Lanka. Surprisingly, sector location did not have a substantial impact. These studies provide valuable insights into the complex dynamics of female labour force participation in Sri Lanka, emphasizing the roles of ethnicity, education, marital status, and income sources in shaping women's participation in the labour market.

The study was carried out in Thirappane Veterinary Division (covering four selected villages) in Anuradhapura district. Data were collected by a household survey using a structured questionnaire from 104 households rearing indigenous chickens. The first step of the Heckman two-stage procedure results showed that households' decision to participate in the poultry market was significantly ($p<0.05$) affected by the sex of the household head and religion. The second stage estimation results revealed that the value of poultry sales was significantly ($p<0.05$) affected by the availability of market information, the number of children below 15 years in the household, bicycle ownership, type of breeds owned, and the location of households (village). Further, the results suggest that the establishment of an effective market information service and the identification of high-yielding indigenous chicken breeds will enhance the sales of indigenous chicken farmers (Abeykoon et al., 2013), identifying the factors influencing the participation and sales of indigenous chicken farmers in Sri Lanka's Anuradhapura district. This investigation employed a Heckman two-stage econometric model and gathered data through a structured questionnaire administered to 104 households engaged in indigenous chicken farming. In the first stage of the Heckman procedure, it was observed that the decision of households to engage in the poultry market was significantly influenced by the gender of the household head and their religious affiliation. Subsequently, in the second stage estimation, it was revealed that the value of poultry sales was notably affected by several factors, including the availability of market information, the number of children under 15 years of age within the household, ownership of a bicycle, the types of chicken breeds in possession, and the location of the household. It's noteworthy that this study concentrated solely on chicken farming and did not encompass an investigation into paddy farmers within the Anuradhapura district of Sri Lanka. This district holds substantial significance in the context of paddy cultivation within the country.There is significant literature on married women's labor force participation (Killingsworth and Heckman, 1986; Blundell and MaCardy, 1999), but few works have compared the thirteen European countries in a framework of panel data for eight years. In the global context, several studies were carried out in relation to the determinants of female labour force participation, focusing generally on the agricultural sector.

In the case of Sri Lanka, there is a lack of papers published focusing on married women and their labour force participation in other sectors except in agriculture. Also, most of them done their research to identify the factors influencing the participation of women in the labor force using the Probit regression model, and they did not analyze the determinants of wage for the respondents who participated in the labour force using the Heckman selection model. Consequently, there is a research gap in this context, and the current study tries to fill the gap by applying the Heckman selection model to explore the factors determining the women's labour force participation and their wages in the agricultural sector, particularly in Anuradhapura district in Sri Lanka. Therefore, the review was useful to explain how demographic and socio-economic characteristics influence the decision of labour force participation of women and the wages in the study area.

Sample selection and method of data collection

The primary data was collected through a semi-structured questionnaire in 2022, and the sample survey was carried out in Anuradhapra district, which has 23 administrative divisions. From these divisions, the Talawa DS division was selected, which has 3 villages such as Katiyawa, Mediyawa, and Kadigawa in the district. Over 45,000 hectares of paddy have been cultivated in Anuradhapura district during the Yala season, although it was initially planned to cultivate paddy on 91,500 hectares in the district. (Daily news, May 25, 2022). Since Anuradhapura district is one of the major paddy production areas in the country, it is the rationale for selecting this district to identify the women's participation and their wages in the agricultural sector. A random sample of 175 women in those areas was selected with the primary data including the preferences of women participation in the agricultural sector and other demographic and socio-economic characteristics of the women in the study. Hence, the study focuses on a specific geographical area in the district, which might limit the generalizability of findings to other regions in the district as well as to entire Sri Lanka.

Methods of data analysis

The collected data were analyzed using frequency and independent samples t-tests to describe the basic characteristics of the variables as well as compare the mean differences in selected data across participant and non-participant women in agriculture. To investigate the factors influencing the determinants of women's participation in agriculture and their wages, the Heckman selection model was applied with two steps using Probit Regression in the first stage and Ordinary Least Square (OLS) regression in the second stage.

The Econometric Model: Heckman Selection Model

Selection bias arises in non-random samples when unobserved factors are correlated both with the probability of being selected in the sample and with the explanatory variables. A common identification strategy when selection bias is suspected is to apply the 'heckit model' proposed by James Heckman in 1976, whose seminal work reconceptualized selection bias as a form of omitted variable bias that can be corrected by adding a control to the model that reflects the probability of selection into the sample. It is a technique used to estimate regression models when there is a problem of sample selection bias, also known as selectivity bias. Thus, the Heckman Selection Model is a statistical framework designed to identify, correct, and omit the sample bias in econometric analysis for acquiring empirical research predictions. Also, it is a two-stage estimation method such as a selection equation where the researchers gauge the probability of a variable being selected as a sample and the outcome equation to determine the relation between the variables of interest.

In cases where the data is collected through random sampling, traditional regression methods like least squares work effectively. However, when data is collected using non-random sampling procedures, standard techniques are not suitable. Within the Heckit framework, it is important to note that the dependent variable Y is observable only for a portion of the dataset where the women are involved in agricultural activities, and where the women are not involved in the sector, they have zero wage. For instance, in labour economics, an individual's market wages are observed solely when that individual actively engages in the labour force. This typically occurs when a worker's market wage is higher than their reservation wage, as per economic theory. When studying wages, there is no access to information about the reservation wage, and for those who are not participating in the labour force, we record a zero-market wage. This type of sample is considered censored because it includes information about both labour participants and non-participants, and if the data consider the individuals who are actively participating in the labour market, it becomes limited to this subset. In such cases, it is crucial to consider the data because the censoring is not directly linked to the dependent variable. Instead, it depends on the difference between the market wage and the reservation wage. As a result, the latent variable that influences sample selection shows a correlation with the dependent variable

E (Z_{i^*}, Y_i)0., leading to a situation where applying least squares to this model introduces selectivity bias. A sample resulting from such self-selection may not accurately represent the actual population distribution, regardless of how

extensive the sample is. Nevertheless, it is possible to address self-selection bias if we have a clear understanding of the underlying sampling process and possess pertinent identification criteria.

When dealing with sample selection biases, relying on OLS regression for estimation often results in inconsistent parameter estimates due to the lack of sample representativeness with respect to the population. To achieve the consistent estimation, alternative methods must depend on robust distributional assumptions, and this is precisely where our reviewed model plays a crucial role.

The Heckit Model comprises two econometric equations:

$$Y_i = X_i\beta + \varepsilon_i \qquad i = 1,\ldots,n,\ N > n \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

$$Z_i = W_i\,\mathrm{Y} + \mu_i \qquad i = 1,\ldots,N \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where Z_i^* is a binary latent variable, with$Y_i$only observed when Z_i = 1, the latent variable is not observed, but we do observe the indicator variable. $Z_i = [1\ Z_i * > 0\ 0\ Otherwise\ ]$

$\varepsilon_i\ and\ \mu_i$ are error terms which follow a bivariate normal distribution.

$$[\varepsilon_i\ \mu_i\ ] \quad \sim \left[\sigma^2\ \rho^\sigma\ \ \rho^\sigma\ 1\ \right]$$

Given a scale parameter "σ" and a correlation coefficient "ρ," it's important to note that we have normalized the variance of "μ_i" to 1, as the variance remains unidentifiable within the model.

The first equation is a linear model of interest, generally referred to as the response equation with "Y_i" the main variable of interest. Equation two, on the other hand, is called the selection equation, and it determines whether "Y_i" is observed or not. The sample comprises N observations, but the variable of interest is only observed for n < N of them. The selection equation (Z_i^*) depends on one or more explanatory variables. To obtain consistent estimates, however, rely on the conditional regression equation given as,

$$E\ (\mathrm{Y}_i|Z_i\ *) > 0) = \beta_1 + \beta_2 X_i + \beta\lambda\lambda_i \qquad i = 1,\ldots\ldots,n \qquad \ldots\ldots\ (3)$$

Where the additional variable lamda (λi) is the inverse mills ratio and it is created from the first step probit estimation of(Z_i^*) in equation (2) and accounts for the fact that the observed sample is not random due to selectivity bias (truncation).

The main idea of the Heckman model is that it seems theoretically rather likely that unobservable or unmeasured factors may affect both the outcome y and the probability of selection z, and these unmeasured factors would be contained in the residuals of both equation (1) and equation (2). Given selection into the main sample, the expected value of the outcome in the main equation is given by regress equation (3), which used the inverse mills ratio (λi) as one of the regressors in the model. In this background, the choice of the Heckman selection model is more appropriate for addressing potential biases than other models. Also, this model was chosen over others due to its suitability for capturing the nuances of women's participation and wages in agriculture sector in the study.

Application of the Heckman Selectivity Model

According to the Heckman procedure, before estimating the wage equation of women, first run a Probit model or the selection model to determine the labour force participation for women in agriculture. Thus, in the first stage, participation or not as a binary dependent variable where 1 for participated, 0 for did not participate, and as explanatory variables, the researchers used age, age squared, availability of credit, possibility of another job, number of children, education, other income sources, and the husband's occupation. The estimated Probit model is given as,

$$P(LFP) = \beta_0 + \beta_1 \text{Age} + \beta_2 \text{ Age squared } + \beta_3 \text{ Availability of credit } + \beta_4 \text{ possibility of other job} + \beta_5 \text{ Number of children} + \beta_6 \text{ Education} + \beta_7 \text{ Other income sources} + \beta_8 \text{ Husband's occupation.}$$

In a Probit regression equation, age squared refers to the variable that has been derived by squaring the age variable. This is done when there is a non-linear relationship between age and the dependent variable. In this case, age squared is included to capture any curvature in the relationship between age and the probability of participation in the labour force. It allows for the possibility that the effect of age on the probability of labour force participation may not be linear but may vary based on the age of the employee.

This indicates that age may have a non-linear relationship with labour force participation, and including age squared helps to capture this relationship. The

coefficient for age squared represents the change in labour force participation for a one-unit change in the square of age, holding all other variables constant.

Thus, the Probit model was used in the first stage of the Heckman model to identify the significant factors influencing women's participation in agriculture. This study considered the above variables to be the main factors in determining the preferences of women's participation in agriculture. Yet, there might be other unexplored variables like cultural factors, land ownership, or family dynamics that could also impact participation that were not considered in the study.

In the second stage of the Heckman selection model, wage is a function of education, farming experience, and the squared term of farming experience. Thus, in the OLS model, wage is the dependent variable, and the above three are the independent variables taken in the model, as given below:

$$Wage = \beta_0 + \beta_1 \text{ Education} + \beta_2 \text{ Farming experience} + \beta_3 \ Squared\ of\ farming\ experience.$$

According to the Mincer earning function, the wage of the workers is determined by the experience and experience squared, where the experience squared explains the non-linear relationship between age and experience. In the beginning, as experience increases, it will lead to earning more income, and after a certain level, even as experience increases, income will not increase further because of the diminishing marginal return of experience on wage. Due to this reason, in the second stage, experience and its squared term are also included in the model.

The following Table 1 describes the variables used in Stage 1 for the determination of women's participation in the agricultural sector in the study.

Table 1: Description of the variables used in stage 1

Stage 1: Participate or not in the agricultural sector

Variables	Unit	Description
Dependent variable		
Participation of women in the agricultural sector	1 for yes, 0 for no	Categorical variable of a woman is whether she participates in the agricultural sector or not.
Independent variables		
Age	Years	Age of the women in years
Age squared	Years	Age squared of the women in years
Availability of credit	1 yes, 0 for no	Categorical variable of a woman is whether she is able to get credit or not.
Possibility of other jobs	1 yes, 0 for no	Categorical variable of a woman is whether she has a possibility to get another job or not.
Number of children	Number	Number of children in the household.
Education	Years	Number of years spent by the women for schooling.
Other income sources	1 for yes, 0 for no	Categorical variable of a woman is whether she is able to earn other income or not.
Occupation the husband	1 for agricultural related, 0 for not	Categorical variable of a husband is whether he is working in an agricultural-related field or not.

Source: Developed by Authors

The following Table 2 describes the variables used in Stage 2 for the determination of wage earns by the women in the study.

Table 2: Description of the variables used in Stage 2

Stage 2: Amount of wage

Variables	**Unit**	**Description**
Dependent variable		
Wage	Rupees	Earnings by the women from the agricultural sector
Independent variables		
Education	Years	Number of years spent by the women for schooling.
Farm experience	Years	Years of farming
Squared of experience	Years	Years of farming

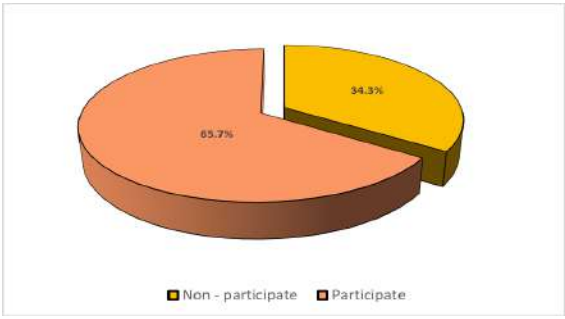
Source: Developed by Authors

Results and Discussions

Frequency analysis

In order to describe the frequency of the women's participation in the agricultural sector who live in the study area, frequency analysis was done, and it is shown by figure 1. It represents that 65.7% of the women engaged in the agricultural sector, while 34.3% of them were not engaged in those agricultural activities in the study. The findings of this analysis revealed that women have a remarkable role in involvement in agriculture in the study area.

Figure 1: Frequency of women's participation in the agricultural sector



Source: Developed by Author

Independent samples t-test

To compare the average differences in selected demographic characteristics such as age, family size, number of children, and education across participants and non-participants in the agricultural sector, they were analyzed using an independent samples t-test. The results from the analysis are depicted in Table 3.

Table 3: Results of independent samples t-test

Variables	Point estimate	Participants (115)		Non-participants (60)		Sig
		Mean	SD	Mean	SD	
Age	0.445	38.80	8.61	35.22	6.83	0.006
Family size	0.451	3.92	1.17	3.45	0.74	0.005
Number of children	0.495	1.87	1.21	1.32	0.89	0.002
Education	-0.801	9.11	2.39	10.98	2.20	0.001

Source: Author's computation from sample survey data, 2022.

The above results revealed that mean values for the above all variables were significant differences across the participants and non-participants of the women in the agricultural sector in the study. According to that, the average age of both participants and non-participants of women in agricultural activities was nearly 38 and 35, respectively, and it is a statistically significant difference at the 1% level. This indicates that relatively older women are more likely to participate in

agriculture than younger women. The value of the point estimate reveals the strength of the differences between two groups in the given variable. According to that, compared to all other demographic variables, education has a highly significant difference between two groups, which represents that the women who spent more years for education are not willing to engage in agriculture than their counterparts.

Results of Heckman Selection Model Two-Step Estimates

Determinants of women's participation in agriculture

The results of the Heckman Two-Stage Selection Econometric Model shown in Table 4 provide the estimates of both the selection or probit equation and the response equation with separate estimations of rho (ρ) and sigma (σ). Both Wald chi^2 (3) = 793.44 and the probability of chi^2 is zero indicate that the estimated model has statistically significance at 1% level demonstrating that the variables used in the model are relevant and explains a significant portion of the variations in the dependent variable.

Further, the Lambda (Inverse Mills ratio—IMR) or selectivity bias correlation factor was a negative value of 64.226, and it is statistically insignificant, implying that there is a selection bias present in the least squares results, thereby validating the use of the Heckman selectivity model for this estimation. This result suggests that there appear to be no unobserved factors that might affect both the probability of women's participation and the wage rate. Since the lambda is not significant, which implies that this selection probability term does not work in an unconditional conditional expectation. Hence, the selection is essentially random, and this term does not deviate from the ordinary least square model, meaning that the results will converge to the ordinary least squares. Moreover, rho is positive with closer to zero, which indicates that unobservable factors are very less but positively correlated with one another. The inverse Mills Ratio (λ) is -2.475 with a p value of 0.101 implying that there is a selection bias present in the least squares results thereby validating the use of the Heckman selectivity model for our estimation.

The above output provides estimates of both the selection or probit equation and the response equation with separate estimations of ρ and σ. Both Wald chi2 (2) = 50.62 and Prob > chi2 = 0.0000 indicates that our model is statistically significant demonstrating that the variables used are relevant and explains a significant portion of the variations in our dependent variable.

Table 4: Results of Heckman's two-stage model and marginal effects

Variables	Coefficients	Standard error	z	P>|z|	Marginal effects
Stage 1: Participation					
Age	.116	0.034	3.33	0.001	….
Age squared	-.0013	. 00055	-2.38	0.017	….
Accessibility to credit	.746	.272	2.74	0.006	….
Other job possibility	-.590	.251	-2.34	0.019	….
Number of children	.234	.140	1.68	0.094	….
Education	-.245	.058	-4.21	0.000	….
Other income sources	.757	.253	2.99	0.003	….
Husband's occupation	-.406	.374	-1.09	0.277	….
Stage 2: Wage					
Education	1545.37	345.09	4.48	0.000	1545.37
Farming experience	2124.06	416.56	5.10	0.000	2124.06
Experience squared	-42.79	16.27	-2.63	0.009	-42.79
Mills					
Lambda	-64.226	3427.527	-0.02	0.985	
rho	0.00816				
Sigma	7867.4043				

Number of observations = 175

Censored observations = 60

Uncensored observations = 115

Wald chi2(3) = 793.44

Probability > chi2 = 0.0000

Source: Author's computation from sample survey data, 2022.

Estimated results of stage 1 confirmed that the participation of women in the agricultural sector is significantly influenced by age, age squared, availability of credit, possibility of other jobs, number of children, education, and other income sources. Among these factors, most of them are statistically significant at the 1% level except the number of children, which is significant at the 10% level in the model. However, the occupation of the husband was insignificant in determining the women's participation in the agricultural sector in the study.

The coefficient of age appears positive and highly significant, indicating that if the age of the women increases by one more year, the probability of participating by women also increases. Older women are more likely to engage in the agricultural sector than young women, and the negative sign of the age squared illustrates that after a certain age, as the women become older, the probability to engage in agricultural activities will decline.

An increase in access to credit would increase the participation of women in agricultural activities. This indicates that access to credit and credit facilities reduces the financial burden of the women and helps them to engage in agricultural activities in the study area. As expected, the probability of women's participation in the agricultural sector was found to be affected negatively by the possibility of other jobs. If the women found any other job opportunities in the rural or city areas, they tried to leave agricultural work and join other non-agricultural-related jobs. The positive effect of the number of children shows that as the number of children increases in the family, the probability for a mother to engage in the agricultural sector also increases, but it is significant at the 10% level. As the number of presence children increases, the cost of living of the household also increases because, to manage the family expenditures, they need to be involved in agricultural activities.

Education is an important factor not only for women's participation in the agricultural sector but also for the number of wages that they are earning. An increase in education by a year reduces the probability of women's participation in agriculture, suggesting that, as women acquire more years of education, there is an increased tendency to participate in agricultural activities. The result suggested that most women perceived agricultural production is not profitable enough or yields fast income as compared to non-agro-based businesses. Therefore, seek out greener pastures (white collar jobs) in the urban area, neglecting farming. This result is also in agreement with the research findings of Akpan et al. (2013), who reported that educated people give less priority to farming because they have a higher chance to find less tedious jobs in the cities

that can earn them a huge sum of income. However, the coefficient of education in the wage equation model has a positive value of 1545/=, which implies that, as the number of years for schooling increases, that will increase the earning capacity by LKR 1545/=. This suggests that acquired knowledge and skills by spending more years for education help them to adopt new techniques and innovations in farming, and thus they are able to earn more income. The coefficient of the existence of other income sources for women was positive and highly significant, indicating that, as the women have other financial supports from income earned by other sources, it will motivate them to invest more in agricultural production activities, and their participation will also increase. It seems that among the monetary variables, accessibility to credit and other income sources played the most important role in women's participation in the agricultural sector. Regarding the other variables describing the husband's occupation status, their impact on women's workforce participation in the agricultural sector did not seem to be significant. It was found that the husband's occupational status had no impact at all in the study.

Determinants of wage of women participation in agriculture

The bottom panel provides the probit coefficients for the selection equation, where it is shown that in the absence of education (coef. 0.104), ceteris paribus, the probability of a married woman participating in the labour force is negative (very slim) considering that all other variables in this model are negatively but significantly related to labor force participation.

The bottom panel provides the OLS coefficients for the wage equation, which show that education, farming experience, and experience squared were tested as influencing the wage of women in the study. Among the tested variables, all of them were statistically significant at the 1% level with expected signs. As in the Probit model, education has a significant impact on the wage equation represented by the OLS model. As the years of schooling for education will lead to an increase in earning capacity, wage earnings from the agricultural sector will also increase. The wages of women increase with the years of farming experience, which represents that one year of additional experience in farming leads to an increase in wages of LKR 2124/-. However, the coefficient of squared term on farming experience has a negative sign, implying that the effect on wages declines as experience accumulates by one more year, which indicates the law of diminishing returns in the production function.

CONCLUSION

This study aimed to explore the factors that determine the preferences of women's participation and the determinants of wages in the agricultural sector in the Anuradhapura district of Sri Lanka. Firstly, the study revealed that approximately 66% of the women actively participate in the agricultural sector in the study area. This underscores that the women have contributed a vital role in engaging in the agricultural sector in the region. The first stage of the Heckman selection model was applied in the beginning to identify the key determinants of women's participation in agriculture. According to that, determinants of women's participation in agriculture have been found to be age, access to credit facilities, the possibility of finding alternative employment, number of children, education level, and other income sources in the model. The analysis provides strong confirmation for the individual characteristics and the family context of the women's decision to participate in agriculture.

Notably, older women were more likely to participate in agriculture than younger women, suggesting the potential benefits of their experience and knowledge of farming activities motivate them to be involved in the sector. Additionally, access to credit was found to be a crucial factor, indicating that providing financial support to women could enhance their involvement in agriculture. Among these determinant factors, education has a negative impact on women's participation in agriculture, implying that the women who have more educational qualifications are less likely to engage in agriculture, and they try to find other jobs.

In stage 2, wages earned by women were taken as a dependent variable, and the estimated ordinary least square results revealed that education was the significant factor in determining women's wages in the agricultural sector. As women obtained more years of education, their earning capacity also increased, emphasizing the importance of educational opportunities for women in rural areas. While the study identifies education as having a negative impact on women's participation, it has positively influenced the wages in agriculture. As the educational knowledge increases, they try to leave the agricultural sector, but the educated women who still engage in the sector have more earning capability due to their application of skills and knowledge they gathered. Furthermore, farming experience had a positive impact on wages, with each additional year of experience leading to higher earnings. However, the law of diminishing returns was observed, as the effect on wages decreased as experience accumulated. Overall findings of the study might limit the generalizability due to constraints such as sample size and the areas covered for the analysis, data collection methods,

and the ignorance of some other variables in determining the participation of women and their wages in the sector. Therefore, identifying these limitations and trying to fill the potential gaps are important, and they could add depth and encourage further investigation in the future.

These findings have significant policy implications in terms of socioeconomics and women's empowerment. Hence, policymakers can use this research to formulate strategies aimed at increasing women's participation in agriculture by focusing on factors such as education, access to credit, and the promotion of agricultural skills and experience. While the conclusion helps policymakers to design the future strategies to develop the agricultural sector, by addressing these determinants it is possible to empower the women in agriculture, improve their economic and societal well-being, gender equality, community development, and finally, contribute to the overall development of the agricultural sector in the study area.

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The Role of Human Resources Flexibility in Strategic Thinking of Strategic Level Military Officers of Sri Lanka Air Force

By NC Ranamukha [1]

ABSTRACT

This paper explores the impact of human resources flexibility on strategic thinking among strategic level officers in the Sri Lanka Air Force (SLAF). Given the dynamic and uncertain nature of modern military and strategic environments, the study highlights the critical role of flexible human capital management in fostering effective strategic thinking. The research adopts a quantitative approach to assess various dimensions of human resources flexibility , including behavioral, skill, and task flexibility. The population considered for this research was the officers currently serving Sri Lanka Air Force in the rank of Wing Commander and above. Data were gathered through a questionnaires and were analyzed using Smart PLS software. The findings reveal that flexible human resources significantly enhance the capacity of SLAF officers to develop innovative and responsive strategies, thereby improving organizational effectiveness. The study highlights that behavioral flexibility enables officers to adapt to diverse scenarios, while skill flexibility ensures continuous learning and adaptation to new challenges. Task flexibility further supports efficient resource allocation and role versatility, contributing to overall strategic agility. The paper concludes that human resources flexibility is essential for military organizations to navigate complex security landscapes and maintain operational readiness. It suggests that fostering an organizational culture that promotes continuous learning, adaptability, and proactive problem-solving is crucial for sustaining strategic advantage. Future research should focus on longitudinal studies to evaluate the long-term effects of human resources flexibility on strategic outcomes in military contexts. The findings have broader implications for policy development and strategic management within defence sectors throughout the world.

KEYWORDS: Human Resources Flexibility,Sstrategic Thinking, MilitarySstrategy, Sri Lanka Air Force, Organizational Adaptability.

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INTRODUCTION

In the modern digital era, individuals, organizations, and states are exposed to an overwhelming and rapid influx of changes, which have led to confusion and a reduction of capacity for making intelligent and adaptable decisions, as noted by Toffler and Toffler (1995). Under such context, the design and creation of a good strategy have become crucial for organizations, a point emphasized by Benito-Ostolaza and Sanchis-Llopis (2014). The process known as strategic thinking entails establishing a structure and internal dynamics that enable organizations to continually challenge external environmental changes. This capacity allows them to predict changes and transformations in the environment well in advance and to select appropriate strategies to address them.

This new thinking in the age of transformation emphasizes that a new intellectual model based on continuous changes must replace the old intellectual model of strategic planning, as discussed by Gibson (2007). According to the theoretical foundations of the strategic planning process, the study of internal and external variables is based on current conditions, as Rezaeian et al. (2014) assert. Thereby, this approach entails choosing the path to reach future goals based on the present conditions, despite the fact that current conditions may not persist, and thus organizations face strategic plans that are constantly becoming obsolete.

Creating a strategy requires managers and individuals who have learned to think differently and create value for customers, an idea introduced by Boone (2001). However, this requires making human resources flexible, meaning the unique ability of organizations to appropriately and timely face and respond to competitive and dynamic environments, as Lopez (1994) points out. Employers in the third wave of the knowledge revolution need men and women who can accept more responsibility, better understand the connection of their work with others, and handle more tasks to mitigate the risk of future shock and confront major transformations, as Toffler (1980) suggests.

Within this perspective, it is often believed that individuals and their thinking capacities play a significant role in empowering organizations to appropriately respond to uncertainty and environmental complexity, as highlighted by Martínez-Sánchez et al. (2014). Flexibility in human resources, through the development of human capital capabilities, better equipping of employees, facilitating management processes, and enabling employee adaptation to environmental changes, fosters and facilitates access to strategic options within organizations,

a point stressed by Abbasi et al. (2014). This is the ultimate goal of strategic thinking.

Among various organizations and institutions, the armed forces play a crucial role in providing the groundwork for economic, social, political, and cultural advancements, especially in the face of ambiguities in future warfare, according to Eftekhari and Dowlatabadi (2009). The uncertainties and complexities of future wars, stemming from multiple revolutions in the military domain, have altered security parameters, compelling countries to consider the waging of wars, as Farjizadeh and Soufi (2010) observe.

Within this framework, and by understanding and grasping the complexities, uncertainties, and non-linear changes in developments, the armed forces of Sri Lanka during the humanitarian operations managed to foresee and identify enemy plans, as evidenced by their success in changing the conditions on the battlefield. Therefore, considering the importance and position of strategic thinking in the defence and military domains, strengthening and institutionalizing this capability is essential, a point reinforced by Kaviani et al. (2018).

Rahmansarshat and Kafcheh (2008) highlight that strategic thinking is influenced by individual, group, and organizational factors. Similarly, Joon Moon (2013) finds that key elements of strategic thinking at the individual level are influenced by internal factors like organizational culture and structure. Factors such as encouragement of creativity, goal-setting alignment, and stakeholder expertise utilization are vital for successful strategic thinking, as Ardakan et al. (2018) emphasize. Information systems, communications, leadership, and resource allocation further enhance strategic thinking in the oil industry, according to Mobarakiyan (2012).

Strategic thinking in the military has been extensively explored, with Hunter and Gang Pope (1993) attributing the term to military origins. Shahali and Valioun (2016) argue that innovative military strategies lead to superiority in current and potential threats. The Industrial College of the Armed Forces (2001) presents models that divide strategic thinking into leadership and cognition components. According to Kaviani et al. (2018), organizational intelligence is a significant factor affecting strategic thinking, particularly in military intelligence units.

Bjørnstad and Frederick (2013) note that flexibility has emerged as a critical factor for organizational continuity in complex environments. Flexibility, seen as an adaptive capability of employees, is essential for responding to changing conditions, as highlighted by Beltrán-Martín et al. (2008). Wright and Snell (1998)

assert that behavioural flexibility, where employees adjust behaviour in varying scenarios, strengthens an organization's adaptability. Skill flexibility, which refers to the rapid acquisition of new skills, is also emphasized by Naqvi et al. (2012) as crucial for evolving job responsibilities.

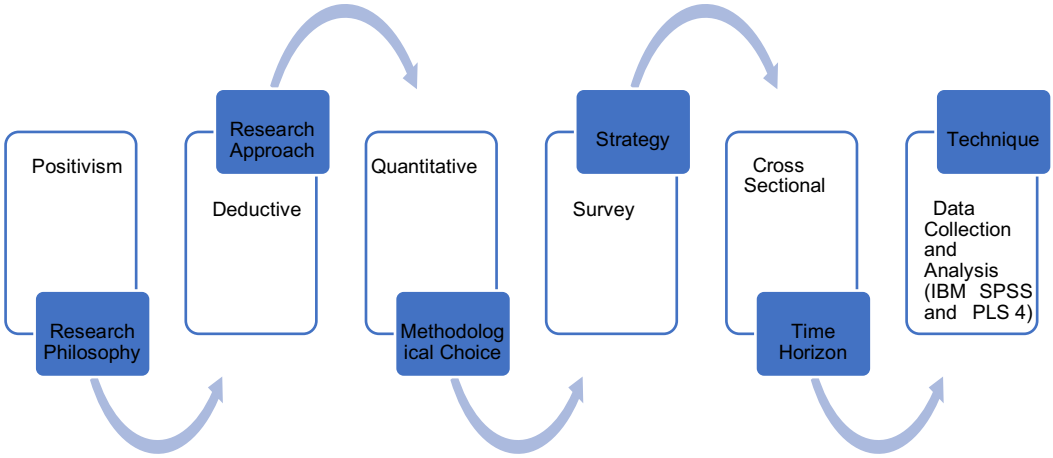
Liedtka (1998) discusses five pillars of strategic thinking: systemic perspective, intent focus, intelligent opportunism, thinking in time, and hypothesis-driven approach. Similarly, Hamel characterizes strategic thinking as artistic and creativity driven. Goldman (2005) introduced components like conceptual and future-oriented thinking. Meshbaki et al. (2008) argue that organizational culture significantly impacts strategic thinking, fostering an environment conducive to creativity and strategic management.

Goldman and Scott (2022) emphasize that leadership development programs focused on strategic thinking help build critical analysis skills. The importance of cognitive flexibility in managing strategic uncertainty is discussed by Herrmann and Nadkarni (2020), while Roberson (2021) suggests that diversity within leadership teams enhances strategic adaptability in global markets.

Methodology

To gather data regarding the dependent variable (strategic thinking), a questionnaire consisting of 16 questions was developed based on Joon Moon's model and the organization's objectives, validated by 10 experts and specialists in the defence field. Based on their feedback (face validity), 4 questions were subsequently removed. The reliability of the questionnaire was confirmed using Cronbach's alpha coefficient, which was calculated as 0.851.

Figure 1: Research Design

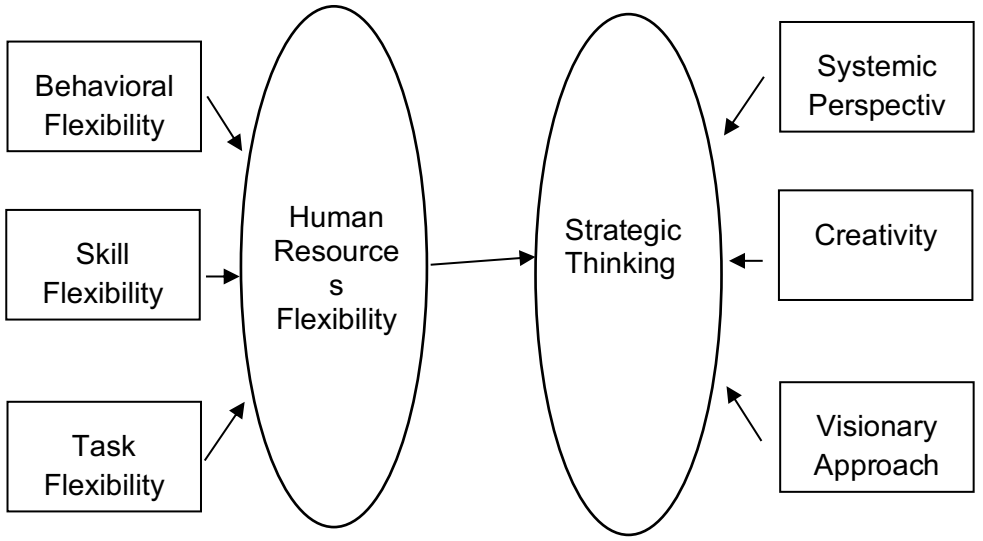


Source: Developed by the Author

Conceptual Model of Research

Ensuring security in any country requires the creation of appropriate defence and military strategies based on national policies, internal capabilities, as well as potential and actual threats and opportunities in the international environment. This necessitates the institutionalization of strategic thinking in the defence and security domain. Therefore, identifying and enhancing the factors influencing strategic thinking is essential for strengthening this fundamental capability within military institutions. In this study, following a review of research background and based on previous research recommendations (Kaviani et al., 2018; Bjørnstad, and Frederick, 2013), the role and position of human resources in the excellence and success of Sri Lanka Air Force, strategic thinking as the dependent variable, and the flexibility of human resources as the independent variable are identified and their relationship is examined based on the conceptual model depicted in Figure 2.

Figure 2: Conceptual Model of the Research



Source: Kaviani et al., 2018; Bjørnstad, and Frederick, 2013

Regarding the independent variable, data were collected using a 12-item questionnaire on human resource flexibility developed by Wright and Snell, which includes components of task flexibility, behavioural flexibility, and skill-based flexibility. This questionnaire was validated by 6 experts and specialists in the research field, and its reliability was confirmed with a Cronbach's alpha coefficient of 0.798. Both questionnaires were validated for their appropriateness to the research structure using exploratory factor analysis.

The population considered was the strategic level Officers of Sri Lanka Air Force in the rank of Wing Commander and above (520 as at 2024). Hence a sample of 222 was considered out of the population of 520 in the 95% confidence level and a margin of error of 5%. Simple random sampling technique was utilized to derive the sample. The questionnaire was administered with google forms.

Data analysis and examining relationships between variables were performed using confirmatory factor analysis and structural equation modelling (SEM) under Smart PLS 4 and IBM SPSS software.

The objective of this study is to explore the relationship between human resource flexibility and strategic thinking within organizations. Specifically, it aims to analyse how different forms of human resource flexibility—behavioural, skill, and task flexibility—individually and collectively impact the ability of organizations to

engage in effective strategic thinking. The study seeks to identify the mechanisms through which these dimensions of flexibility enhance strategic decision-making, adaptability, and long-term planning, ultimately contributing to the organization's capacity to navigate complex and dynamic environments. Through this analysis, the research will provide insights into how fostering flexibility in human resources can be a strategic asset for organizations aiming to improve their strategic capabilities. The Hypothesis of the research are as follows.

Hypothesis

H: Human resource flexibility has a positive impact on strategic thinking.

Sub-hypotheses:

H1: Behavioural flexibility has a positive impact on strategic thinking.

H2: Skill flexibility has a positive impact on strategic thinking.

H3: Task flexibility has a positive impact on strategic thinking.

Data Analysis

Factor Analysis

In this study, to ensure the adequacy of questionnaire items with research constructs, the KMO test, Bartlett's test, and exploratory factor analysis were employed. The validity of each question

Table 1: Content Validity of Strategic Thinking Questionnaire Using Exploratory Factor Analysis

KMO and Bartlett's Test	Factor Structure
0.891	Systemic Attitude
0.762	Creativity
0.793	Visionary Perspective

Source: Developed by the author

Table 2: Content Validity of Human Resource Flexibility Questionnaire Using Exploratory Factor Analysis

KMO and Bartlett's Test	Factor Structure
0.756	Behavioral Flexibility
0.764	Skill Flexibility
0.803	Task Flexibility

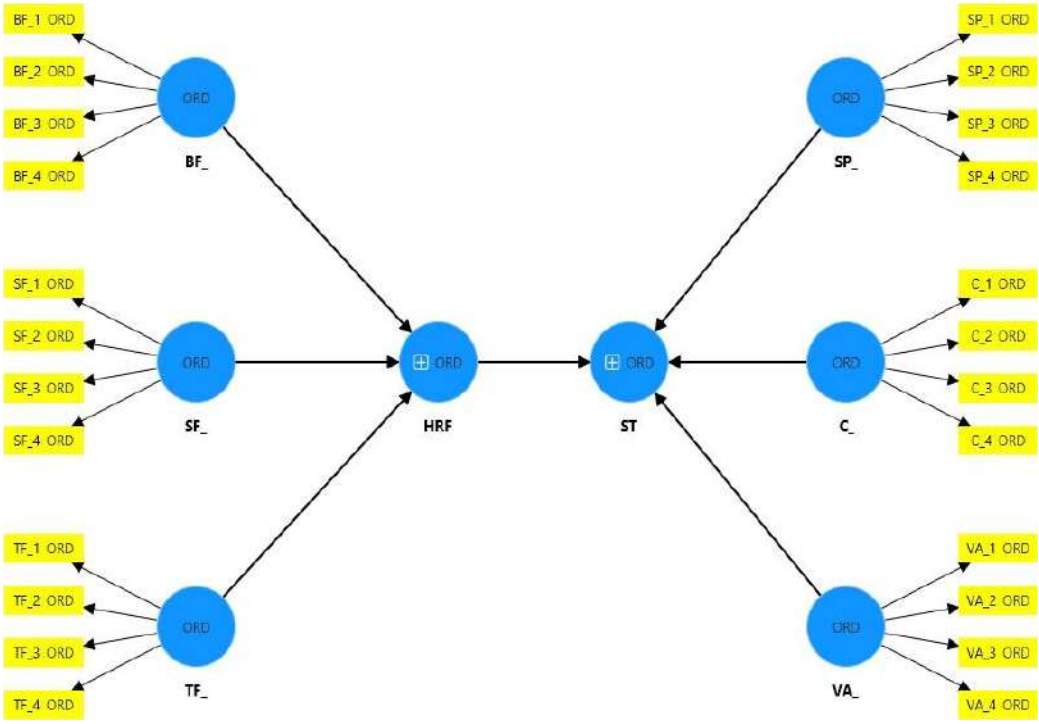
Source: Developed by the Author

Tables 1 and 2 present Kaiser-Meyer-Olkin (KMO) measures and Bartlett's Test results for different constructs in factor analysis. For the first set of values (0.756 for Behavioural Flexibility, 0.764 for Skill Flexibility, and 0.803 for Task Flexibility), the KMO values indicate moderate to high suitability for factor analysis, suggesting that the variables measuring behavioural, skill, and task flexibility correlate well enough to support a coherent factor structure. In the second set (0.891 for Systemic Attitude, 0.762 for Creativity, and 0.793 for Visionary Perspective), higher KMO values for systemic attitude suggest strong internal correlations among its variables, indicating a robust factor structure. However, moderate KMO values for creativity and visionary perspective imply that while variables within these constructs correlate reasonably well, there may be some variability or overlap that could benefit from further refinement or inclusion of additional variables to strengthen their factor structures.

Evaluation and Interpretation of the Conceptual Model

Figure 3 depicts the conceptual model of the research along with path coefficients and model fit indices, as generated by Smart PLS software. The fit indices below the figure indicate a good fit of the model with the data.

Figure 3: SEM model for Smart PLS 4 data analysis



Source: Developed by the Author

Among the dimensions of Human Resource Flexibility, Task Flexibility with a path coefficient of 0.834 plays the most significant role, while Skill Flexibility with a path coefficient of 0.703 has the least impact on explaining Human Resource Flexibility. Among the dimensions of Strategic Thinking, Systemic Perspective has a greater role in explaining Organizational Agility compared to the rest.

Evaluation of Model Fit and Research Hypotheses

Tables 4 and 5 summarize the key fit indices, indicating that the model fits the data adequately.

Table 3: Standardized Path Coefficients

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
BF_ -> HRF	0.715	0.705	0.015	4.323	0
C_ -> ST	0.719	0.713	0.022	5.371	0
SF_ -> HRF	0.703	0.695	0.025	5.424	0
SP_ -> ST	0.805	0.786	0.026	7.298	0
TF_ -> HRF	0.834	0.853	0.019	5.357	0
VA_ -> ST	0.447	0.436	0.011	4.021	0

Source: Developed by the Author

Table 4: Structural Model Fit Indices of the Research

	Saturated model	Estimated model
SRMR	0.03	0.03
d_ULS	4.552	4.552
d_G	5.969	5.705
Chi-square	1.21	1.21
NFI	0.95	0.95

Source: Developed by the Author

The table presents various fit indices comparing a saturated model, which represents a model with perfect fit, and an estimated model, derived from structural equation modelling (SEM) analysis. Both models show a consistent fit across several metrics: Standardized Root Mean Square Residual (SRMR) indicates minimal discrepancy between observed and predicted correlations, with both models achieving an excellent fit (0.03). Unweighted Least Squares Discrepancy (d_ULS) similarly shows no difference between the models, with both at 4.552, suggesting they reproduce observed covariance matrices equally

well. Bentler's Comparative Fit Index (d_G) shows a slightly lower value for the estimated model (5.705 vs. 5.969 for the saturated model), implying slightly better fit of the estimated model compared to the perfect fit model. Chi-square values are identical (1.21), indicating both models fit the covariance structure equally well, albeit sensitive to sample size. Normed Fit Index (NFI) is high and consistent (0.95), indicating both models fit well relative to a baseline model. Overall, the findings suggest that while the estimated model slightly improves upon the perfect fit model in terms of some fit indices, both models generally provide a robust representation of the data with high consistency across multiple evaluation metrics.

Table 5: Path coefficients of the determinants of Human resources flexibility

Path Coefficient	Interpretation
0.715	Behavioural Flexibility significantly influences Human Resource Flexibility.
0.834	Task Flexibility has a significant influence on Human Resource Flexibility.
0.703	Skill Flexibility significantly affects Organizational Human Resource Flexibility.

Source: Developed by the Author

These findings indicate that all hypotheses are supported, affirming the relationships proposed in the conceptual model. The path coefficients indicate significant positive relationships between various forms of flexibility and Human Resource Flexibility. Behavioural Flexibility (0.715), Task Flexibility (0.834), and Skill Flexibility (0.703) all show strong influences on organizational HR flexibility. These findings suggest that organizations benefit from employees who can adapt their behaviour, tasks, and skills, enabling them to effectively manage human resources in dynamic environments.

Table 6: Main Hypothesis of the Research with Path Coefficients and Statistical Significance

Main Hypothesis	Path Coefficient	p-value	T-statistic	Coefficient of Determination	Conclusion
Human Resource Flexibility -> Strategic Thinking	0.896	0	5.87	0.85	Strongly supports significant influence

Source: Developed by the Author

Based on the results in Table 6, with 95% confidence, it can be stated that Human Resource Flexibility has a positive and significant effect on Strategic Thinking in the organization. Additionally, according to the coefficient of determination, the Human Resource Flexibility variable has predicted 89% of the variance in Strategic Thinking in the target organization. Meanwhile, Table 7 presents the findings of the confirmatory factor analysis using structural equation modelling for testing the secondary hypotheses of the study.

Table 7: Findings from Structural Equation Modelling in Testing Secondary Hypotheses of the Research

Secondary Hypothesis	Standardized Coefficient	Significance Level	Results
Behavioral Flexibility (BF) -> Strategic Thinking	0.894	0.001	Supported
Skill Flexibility (SF) -> Strategic Thinking	0.842	0.001	Supported
Task Flexibility (TF) -> Strategic Thinking	0.774	0.005	Supported

Source: Developed by the Author

The results confirm the support for all secondary hypotheses of the study. In other words, with 95% confidence, it can be concluded that Behavioural Flexibility, Skill Flexibility, and Task Flexibility each have a positive impact on Strategic Thinking.

Conclusion and Discussion

Military organizations are typically engaged in environments with rapid changes where stability may come at a low cost or may not be achievable at all, as Bjørnstad and Frederick (2013) discuss. In such conditions, merely observing the strategic environment continuously and identifying and understanding potential and actual threats and opportunities can lead organizations to their ultimate goal of achieving security.

This study examined the relationship between human resource flexibility and strategic thinking among the strategic level of the Sri Lanka Air Force. A strategic thinking approach can be considered essential in achieving sustainable competitive advantage, where flexible human resources can play a crucial role. Based on the results of the main hypothesis testing, it can be stated that human resource flexibility can enhance strategic thinking. Despite the lack of scientific exploration of this relationship in the military context, the findings align with previous studies on the subject matter, as noted by Kaviani et al. (2017) and Úbeda-García et al. (2016).

The findings of the research indicate that human resource flexibility improves multi-skills, decision-making abilities, problem-solving capabilities in response to changing conditions, adaptation to new circumstances, and continuous learning capabilities. This holistic view helps organizations adapt to environmental changes. Furthermore, the implementation of military unit agile transformation plans is crucial. These plans include diversifying employees' skills, delegating decision-making authority for different levels of authority and specific conditions, and reducing communication hierarchies, as discussed by Esmizadeh and Bashir (2014).

Moreover, findings from the secondary hypotheses demonstrate a positive relationship between behavioural, skill, and task flexibilities with strategic thinking. This suggests that flexibility enables individuals with diverse skills to perform effectively in various situations and enhances their capacity to understand environmental complexities, thereby increasing their tolerance for heterogeneous behaviours, a point made by Esmizadeh and Bashir (2014). This issue is vital given the job and occupational characteristics in the defence sector.

Considering the research results, it appears that human resource flexibility should be regarded as a suitable strategy for the Sri Lanka Air Force in facing turbulent and complex environments. However, achieving this requires nurturing and maintaining capable employees, investing in training, balancing work-life and

family life, updating employees' knowledge and skills, and creating motivation and capacity in human resources for leveraging opportunities, as Úbeda-García et al. (2016) emphasize. Alongside these factors, fundamental changes in organizational structuring, job classification, and salary systems within the armed forces are essential requirements that must be considered for human resource flexibility. For instance, in organizations striving for internal operational flexibility and rapid responsiveness to conditions, traditional job-based systems are ineffective compared to competency-based systems that emphasize multiple skills or necessary competencies and employees' abilities to undertake diverse tasks in different teams, as Bamberger et al. (2015) discuss.

In the sphere of behavioural flexibility, providing conditions for facing significant and unprecedented situations, enhancing risk-taking capabilities, self-confidence, and creating necessary frameworks for the flourishing of employees' potential abilities will lead to their effective performance in various situations. In other words, developing behavioural codes, encouraging compliance in different situations, and considering concurrent behaviours with discretion for suitable roles will contribute to achieving flexibility in resources, as Armstrong (2016) suggests. Given the complexity of conditions and the risks of organizational advancement, this issue must be prioritized within strategic human resource management plans more than ever before. Moreover, some researchers believe that improving task flexibility enables organizations to achieve strategic alignment and adapt to environmental changes.

In addition to the above-mentioned factors, creating a comprehensive picture and creative perspectives of future battlefields in the strategic thinking process, especially within military units, necessitates actions, training, and exercises that require special attention. Since any information in different fields and specialties can impact the fulfilment of military organizations' tasks and missions, all military personnel must be proficient in tactical and technical skills. Another notable point is that enhancing strategic thinking capacities and human resource flexibility in military units requires the utilization of simulation software for future wars and theories such as game theory for training to enhance employees' understanding and insight, as Armstrong (2016) also notes. While real operations complement theoretical training, motivational factors, strong determination, and appropriate psychological and spiritual conditions are crucial for voluntary engagement in challenging fields. Utilizing ideological discussions and social capital can be instrumental in this regard. Understanding the worldviews and philosophical beliefs of potential and actual enemies can significantly influence predicting their future actions and identifying the strengths and weaknesses of combat forces.

Therefore, familiarity with the philosophical and ideological doctrines of enemies is vital for military units.

Recent research underscores the critical role of human resource flexibility in enhancing strategic thinking within military organizations. Nguyen et al. (2022) found that increased flexibility in human resources significantly improves decision-making and adaptability, crucial for responding to dynamic threats and opportunities. Their study highlights that flexible human resources contribute to better strategic alignment and organizational performance, aligning with the findings that human resource flexibility enhances strategic thinking.

Moreover, recent advancements in training methodologies support the development of strategic thinking through simulation and scenario-based exercises. Patel et al. (2024) demonstrated that simulation-based training enhances strategic decision-making and operational readiness, providing practical insights into managing complex and unpredictable situations. This finding supports the recommendation to incorporate advanced training technologies to foster strategic thinking and adaptability within military units.

Additionally, Kumar and Singh (2023) emphasized the shift towards competency-based systems in dynamic environments, which aligns with our recommendation for diversifying skills and reducing communication hierarchies. Their research indicates that competency-based approaches, which focus on multiple skills and diverse task capabilities, are more effective than traditional job-based systems in supporting organizational flexibility and responsiveness.

These recent studies reinforce the importance of integrating human resource flexibility and innovative training methods to enhance strategic thinking and operational effectiveness in military settings. Thereby, future research should continue to explore these areas and consider additional factors, such as intellectual capital and psychological empowerment, to further understand their impact on strategic thinking. Furthermore, paying special attention to individual training alongside group training and knowledge sharing is essential for military institutions and needs to be included in their planning. Considering the conditions and characteristics of the target organization, the generalization of the current study's results to different societies should be done with careful consideration of various aspects. Moreover, since this study only considers human resource flexibility as an explanatory variable for strategic thinking, it appears that other variables such as intellectual capital and psychological empowerment of military personnel can also explain changes in strategic thinking within the Sri Lanka Air Force, which should be investigated in future research.

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Reset, Restart, and Refocus on Communication Competence and Exploring the Role of Communication in the Inclusive Setting: A Study Based on Grade 03 Students of Southlands College, Galle

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ABSTRACT

Communication is the cornerstone of human existence and a fundamental right for all. The principles of inclusive education drive the integration of children with special needs into mainstream education, ensuring equal treatment and non-discrimination for all students. Inclusive education greatly benefits children with learning disabilities by offering equal educational opportunities, regardless of their needs, abilities, socioeconomic status, race, nationality, gender, religion, health, or location. This research paper examines the implementation of inclusive education in Grade 3 at Southlands College, Galle. It explores the perceptions of Grade 3 teachers and parents on the role of communication in integrating children with special needs. The study focuses on communication strategies, essential characteristics, and their practical application when working with these children. Grade 3 teachers and parents at Southlands College completed a self-designed questionnaire assessing their awareness of the importance of communication in children's social, emotional, and cognitive development, as well as their understanding of inclusive education for children with special needs. The questionnaire also evaluated the readiness of Grade 3 teachers to communicate effectively with special needs children and their parents in an inclusive educational environment. The data were analyzed quantitatively using Microsoft Excel, followed by qualitative analysis involving coding and indexing. The research findings indicate that Grade 3 teachers lack the necessary communication skills to work effectively with children with special needs, particularly when dealing with parents who have limited communication abilities. As a result, it is recommended to enhance communication competence and re-evaluate the role of communication within the inclusive education framework.

KEYWORDS: Communication, inclusive education, learning disabilities, mainstream education, special needs

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INTRODUCTION AND RESEARCH PROBLEM

Inclusive education is crafted to accommodate students with a spectrum of abilities, ensuring equitable treatment and equal opportunities for all. Within such an environment, student diversity and individuality are acknowledged and esteemed without bias. The foremost objective of inclusive education is the eradication of prejudice and discrimination against all learners. Inclusive communication recognizes and promotes diverse modes of interaction, both verbal and non-verbal, underscoring that unspoken elements can be as crucial as spoken ones. By integrating comprehensive relational skills into everyday interactions, the potential for positive and effective engagement with all individuals is heightened. As educators, we champion equity and inclusive education for every child (Geghamyan, 2015). With classrooms becoming increasingly diverse, intercultural communication skills are indispensable. The classroom teacher is pivotal in ensuring that each student feels welcomed, comfortable, and motivated to maximize their learning potential within the classroom's environment and culture. Effective communication and inclusivity are intrinsically linked, fostering robust relationships grounded in mutual respect and trust between students and teachers. According to Piaget's constructivist learning theory (Mcleod, 2020), dialogue is essential for students to assimilate new knowledge with their existing frameworks. By promoting interaction and participation, all students can develop a sense of belonging and cultivate meaningful peer relationships. Properly executed inclusion benefits everyone in the classroom, enhancing students' capacities to collaborate, appreciate diverse perspectives, think critically, and succeed academically.

In academic literature, inclusive education is described as an ideology (Allan 2014) that guides the practice of respecting every learner's right to receive a quality education. Booth (2009) highlighted that inclusive education aims to enhance participation for all learners, establish systems that equally value every individual, and promote fairness, empathy, human rights, and respect. Other critical components include increased integration into regular classrooms, ensuring equal opportunities for academic and social success, adopting inclusive teaching methods, and fostering inclusive school environments (Florian, 2011).

The research addressed a critical issue: it was uncertain whether primary teachers and parents at Southlands College comprehended the significance of communication in the social, emotional, and cognitive development of children, as well as in the implementation of inclusive education for students with special needs. Additionally, it was unclear whether Grade 3 teachers at Southlands

College were adequately prepared to effectively communicate with special needs children and their parents in an inclusive educational setting.

1.2 Background of the Research

In the Grade 03 parallel classes at Southlands College, Galle, there were several children identified with learning disabilities (LD). Each Grade 03 class accommodated at least 3 or 4 LD children. It is noteworthy that these children having special needs did not experience physical impairments akin to blindness or deafness but rather exhibited uneven development in cognitive areas, particularly in aspects such as memory.

Given these circumstances, inclusive education for students with learning disabilities assumes paramount importance. This research paper delved into the significance of communication within inclusive education for children with LD.

The efficacy of inclusive classrooms hinges significantly on the participation of parents and students with learning disabilities (LD) in the educational process. This study underscores that parental engagement in education profoundly enhances the outcomes of inclusive teaching, fostering active enthusiasm for learning among children. Therefore, maintaining regular communication with parents of LD children is essential to improving their academic performance.

Children with LD exhibit unique characteristics and requirements, with parents often possessing a deeper understanding of their children as their closest allies. Inclusive education aims to establish individualized goals for each student's growth and learning. The seamless operation of inclusive classrooms necessitates teachers' adept guidance for every student. Effective collaboration with professionals through communication enables educators to enhance their understanding of LD children, thereby facilitating well-regulated inclusive classrooms. Once established, such collaboration greatly benefits LD children, empowering them to reflect on their strengths and weaknesses and make self-improvements with the support of teachers and parents.

Together, parents and teachers can actively assist LD children in exploring their interests and realizing their full potential. This research highlights that such cooperative efforts restore self-confidence in LD children and foster a conducive learning environment where they can engage meaningfully with peers, teachers, and parents through understanding and encouragement.

1.3 Objectives of the Study

This research study aims to accomplish the following objectives:

(i) To ascertain teachers' and parents' awareness regarding the importance of communication in fostering social, emotional, and cognitive development and in implementing inclusive education for children with special needs.

(ii) To evaluate the readiness of Grade 03 teachers at Southlands College in effectively communicating with children with special needs and their parents during the execution of inclusive education.

REVIEW OF THE RELEVANT LITERATURE

Educators universally prioritize the enhancement and significance of communication in various contexts. Communication skills directly influence teaching styles and methodologies. M. Lewis, in "Communication and Education," argues that communication challenges persist within education, noting teachers often operate in isolating conditions (Lewis, 1952, p. 28). Miscommunication among teachers frequently leads to misunderstandings and ineffective student learning outcomes. Paulo Freire's "Pedagogy of the Oppressed" proposes a transformative relationship among teachers, students, and society, identifying an inherent "narrative sickness" in education (Freire, 1968, p. 71). Freire critiques traditional education as dehumanizing, advocating for an approach that empowers both students and teachers.

He argues against the notion of students as passive receptacles filled with information, positing that genuine critical thinking only occurs through active communication and engagement with reality (Freire, 1968, p. 77).

Tony Lynch, in "Communication in the Language Classroom," illustrates the limitations of fixed exchange communication patterns between teachers and students, highlighting the cycle of "Initiation," "Response," and "Feedback" (Lynch,1996). This model often reduces communication to a simplistic transactional process, masking the complexity of true communication dynamics in the classroom. The integration of pedagogy and communication is underscored by Pat Petrie in "Communication Skills for Working with Children and Young People: Introducing Social Pedagogy" (Petrie, 2011). Petrie emphasizes that effective pedagogical practices rely heavily on strong communication, particularly in establishing positive relationships with students. She asserts that nurturing these relationships fosters enthusiasm and promotes effective learning outcomes among students.

In conclusion, effective pedagogy hinges on robust communication strategies that engage students, challenge them, and foster learning success in every classroom. Teachers must therefore assume a leadership role in implementing

pedagogically sound approaches that prioritize meaningful communication and relationship-building with their students.

RESEARCH METHODOLOGY

The research methodology described in the study is a mixed-methods approach. This approach integrates both quantitative and qualitative techniques to investigate communication competence in the context of inclusive education.

3a.Quantitative Techniques:

The study likely employed quantitative methods through the use of student questionnaires to gather data on student preferences and perceptions regarding classroom communication. These questionnaires, including both yes/no and open-ended questions, aimed to quantify aspects such as student satisfaction, preferences, and levels of engagement.

3b.Qualitative Techniques:

Qualitative methods were utilized through observations and semi-structured interviews with teachers and parents. Observations provided qualitative data on student-teacher relationships, classroom dynamics, and communication techniques used in the learning environment. Semi-structured interviews allowed for in-depth exploration of participants' perspectives on the role of communication in education, inclusive practices, and the impact on social, emotional, and cognitive development.

3.1 Research Design

The research design in this study is descriptive research, as it aimed to describe and explore communication competence in an inclusive educational context using a mixed-methods approach.

This study involves observing and describing the behavior of a subject without influencing it in any way. In this study:

The various aspects of communication competence in an inclusive education setting among Grade 3 students, teachers, and parents were observed and described.

They utilized methods such as observations, questionnaires, and semi-structured interviews to gather detailed information about student-teacher relationships, classroom dynamics, communication techniques, and participants' perceptions.

The focus was on describing the current state of communication practices and understanding participants' perspectives rather than manipulating variables or establishing cause-and-effect relationships.

The mixed methods approach in this study facilitated a thorough examination of communication competence in inclusive education by triangulating findings from different data sources and participant viewpoints.

3.2. Sampling Procedure

The sampling technique used was convenience sampling, as all Grade 3 students and a subset of their parents from Southlands College were included based on their accessibility and willingness to participate.

The research population was sourced from Southlands College, Galle Fort. The study encompassed 20 teachers, 200 all Grade 3 students, and a subset of their 80 parents. Instruction in these classes was conducted in the native language, Sinhala.

The participants in the current study included Grade 3 students, their parents, and their teachers. The total cohort comprised 300 individuals: 200 Grade 3 students, 20 teachers, and 80 parents of the Grade 3 students. The students were aged between 8 and 9 years old. Observations were conducted across six classrooms, each led by different teachers. This approach facilitated an examination of whether the teachers employed distinct teaching styles or adapted their methods to accommodate varying student groups.

3.3 Instrumentation

The study employed three main instruments: observations, student questionnaires, and semi-structured interviews. These instruments were designed to collect comprehensive data that ensured the study's reliability, validity, and depth of insights from multiple participant perspectives.

Three instruments were designed to collect relevant information for this study:

(i) ***Observations***: These were conducted to gather thorough and detailed information about student-teacher relationships, the overall classroom atmosphere, interactions between teachers and students, and the communication techniques used to motivate students during the learning process. Notes were taken during the observations to identify the degree of interactivity, levels of communication, and types of communication within the classroom. A total of 18 observations were conducted across six different classrooms, with three distinct subjects observed in each class.

(ii) ***Student Questionnaires***: Designed to understand students' preferences regarding their school, classrooms, and classes, as well as to determine whether teacher-student interactions fostered their passion for school. The questionnaire included both yes/no and open-ended questions, providing insight into the students' level of learning based on classroom communication. Students were asked to rank their preferences about the school, rating factors from 1 (least preferred) to 5 (most preferred). This query aimed to discern whether students favored teachers or courses more and to gauge their enthusiasm for attending school .

(iii) ***Semi-structured Interviews with Teachers***: These interviews provided an excellent opportunity to listen to teachers' opinions and viewpoints about the importance of communication in the classroom. The interviews aimed to understand the strategies and techniques teachers use to boost student enthusiasm. The questions addressed their teaching styles, knowledge of effective communication techniques, any restrictions imposed by schools or the Ministry of Education, and more. These interviews also assessed whether primary teachers were prepared to communicate effectively with special needs children and their parents in the context of inclusive education.

Additionally, the interviews aimed to determine if teachers and parents recognize the significance of communication in the social, emotional, and cognitive development of children, as well as in the implementation of inclusive education for children with special needs.

(iv) ***Semi-structured Interviews with Parents***: These interviews were conducted to understand if parents were aware of the importance of communication in their children's social, emotional, and cognitive development.

3.4 Data Collection

The data were collected at Southlands College in Galle, as previously noted. The instrumentation encompassed a questionnaire featuring yes/no questions, alongside personal interviews and observations. Consequently, both quantitative and qualitative methods were employed to analyze the data. Initially, the data were analyzed quantitatively using Microsoft Excel, followed by a qualitative analysis involving coding and indexing.

3.5 The Management of Confidentiality and Anonymity

Maintaining the anonymity and confidentiality of participants is crucial in this social research endeavor. Furthermore, the project abstained from collecting identifying information such as names, addresses, or emails. Throughout the data collection

process, all participants were assured that their information would not be disclosed to any third party.

RESULTS AND FINDINGS

This section presents the outcomes of the research examining the impact of teacher-parent and teacher-student communication on students' communication skills within an inclusive educational environment.

4a. Classroom Observations

Given the focus of this study on teacher-student communication styles and methods, observations were conducted during Social Studies and Math classes in Grade 03 at Southlands College, where instruction was conducted in the native language. Observational data were partially collected, totaling 18 observations across 6 classrooms, with 3 observations per classroom. The objective was to assess the extent of teacher-student interaction in the classroom and correlate these findings with insights from interviews and student questionnaires.

During these observations, it was noted that teachers primarily engaged with students who showed interest and participated actively in the subject matter. Typically, students seated in the front rows, numbering between four and six, were the main participants in answering teachers' questions. Conversely, the remainder of the class exhibited minimal engagement or participation. Teachers predominantly directed yes-or-no questions to students in the front rows without effectively integrating the rest of the class into the learning process, particularly the students with learning disabilities (LD)

4b. Questionnaire for Students

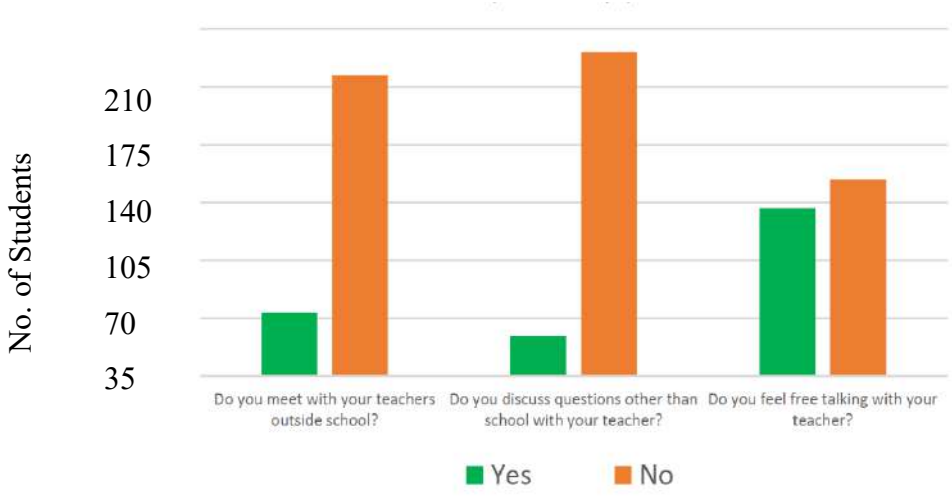
Results indicated that classmates were the primary motivator for attending class, followed by teachers, courses, the cafeteria, and counseling services. This highlights teachers as a significant but less compelling source of motivation compared to peers.

Additionally, students were invited to provide detailed feedback through open-ended questions, specifically about what they appreciate most in their teachers—whether personal traits or professional qualities. Responses ranged from communication style and professionalism to warmth, wisdom, and kindness.

The final segment focused on students' perspectives regarding teacher-student interaction, framed in yes/no questions. Across all classrooms, responses were consistent: most of the 200 students indicated they did not meet with their teacher

outside of school, discuss questions with them outside of class, or feel comfortable initiating conversations with them (see Figure 1).

Figure 1: Opinion on Teacher-Student Interactions



Source: Developed by Author

4c. Interviews for Teachers

The responses from the five teachers interviewed exhibited a consistent theme. Each teacher emphasized that fostering healthy relationships and cultivating a positive classroom environment significantly enhances student performance. During classroom observations, it was noted that teachers tended to conduct traditional lectures, limiting opportunities for interactive communication.

4d. Parent Interviews

Parents interviewed highlighted additional factors that motivate student learning, such as aspirations for higher education and career advancement. One parent mentioned using engaging activities and materials as incentives, alongside nurturing positive relationships with students. Most parents emphasized the importance of student interaction, including communication within the classroom, in fostering enthusiasm for school. However, classroom observations indicated sparse student-to-student communication.

DISCUSSION

The findings from this study shed light on several crucial aspects of teacher-student and teacher-parent communication within the inclusive educational

setting of Grade 03 at Southlands College, Galle. This discussion synthesizes the results from classroom observations, student questionnaires, teacher interviews, and parent interviews to explore their implications for enhancing students' communication skills. (Dhanapala, 2009)

5.1 Teacher-Student Communication Dynamics

Classroom observations revealed a predominant pattern where teacher-student interactions were heavily skewed towards students who actively participated and sat in the front rows. This selective engagement suggests a potential limitation in inclusive practices, as students with learning disabilities (LD) or those less inclined to participate may receive less attention and interaction from teachers. The use of yes-or-no questions primarily directed at front-row students further underscores a missed opportunity for broader classroom engagement and inclusivity.

Moreover, students' responses in the questionnaire indicated that peers were a more significant motivator for attending class compared to teachers. This finding underscores the need for teachers to enhance their communication strategies to foster stronger connections with all students, not solely those who naturally engage more actively.

Interestingly, despite positive feedback on teachers' personal and professional qualities, such as communication style and warmth, a significant number of students expressed discomfort in initiating conversations with their teachers outside of class. This reluctance could impact students' overall communication development and their ability to seek academic support or guidance beyond regular class hours.

5.2 Implications for Practice

The insights gathered from both students and teachers highlight several actionable implications for improving communication competence within the classroom:

Enhancing Inclusive Practices: Teachers should adopt strategies that encourage equitable participation among all students, including those with learning disabilities. This could involve varied questioning techniques, collaborative learning activities, and differentiated instructional methods tailored to individual learning needs.

Strengthening Teacher-Student Relationships: Building on positive feedback regarding personal traits, teachers could proactively foster more accessible

channels of communication outside of formal class settings. This might include designated office hours, informal check-ins, or digital platforms for Q&A sessions aimed at enhancing students' comfort levels in seeking academic support.

Promoting peer interaction: Given the significant influence of peers on student motivation, educators should also facilitate opportunities for structured peer interactions within the classroom. This could encourage collaborative problem-solving, peer mentoring, or group projects that promote communication skills alongside academic learning.

Engaging Parents as Partners: Parental involvement emerged as a crucial factor in motivating student learning and fostering enthusiasm for school. Collaborative efforts between teachers and parents, focusing on effective communication strategies and shared educational goals, could further enhance student engagement and overall academic performance.

5.3 Limitations and Further Research

While this study provides valuable insights into communication dynamics within Grade 03 classrooms, certain limitations should be acknowledged. The sample size of observations, questionnaires, and interviews, though substantial, may not fully capture the diversity of experiences across all classrooms and student backgrounds within Southlands College. Future research could explore the longitudinal effects of improved communication strategies on students' academic outcomes and social-emotional development within inclusive educational settings.

This study underscores the pivotal role of communication competence in fostering an inclusive and supportive learning environment. By leveraging these findings to inform pedagogical practices and interpersonal interactions, educators can strive towards optimizing student engagement, communication skills, and overall academic success.

CONCLUSION

When working with children who have special needs, a communicative approach model becomes imperative due to the communication challenges they face. Teachers bear the responsibility of implementing principles of inclusive education since these students are integrated into mainstream schooling. The preparedness of teachers is crucial given their pivotal role in supporting children with special needs. This study underscores the deficiency in communicative competencies among teachers working with such students, particularly those whose parents also lack adequate communication skills.

Parents increasingly emphasize the importance of their children's ability to communicate with peers, gain acceptance, and spend time socializing where they can practice their communication skills. This paper elucidates the critical role of communication in the learning journey of children with learning disabilities (LD) within the framework of inclusive education. Effective communication between teachers and students is pivotal in cultivating an optimal inclusive classroom environment, while strong teacher-parent communication significantly enhances school-family relationships and parental involvement in inclusive education initiatives.

The specific needs of LD students must be earnestly addressed within inclusive classrooms, emphasizing the necessity for comprehensive communication among the school, teachers, and parents.

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