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An Effect of Screen Time and Physical Activity on Cognition in Physiotherapy Students Due to Online Studies - An Exploratory Survey

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Abstract: COVID-19 infection has a broad spectrum of severity ranging from an asymptomatic form to a severe acute respiratory syndrome that requires mechanical ventilation. The virus was first identified and reported from Wuhan city. The SARS-CoV-2 is highly contagious, spread globally in a short period of time, and was declared a global pandemic by the World Health Organization on March 11, 2020. The coronavirus disease 2019 (COVID-19) pandemic has led to laws and policies that include national school closures, lockdown or shelter-in-place laws, and social-distancing recommendations that may translate to higher overall screen time among children and adolescents for the duration of the enforcement of these laws and policies. High levels of screen time in early childhood also appear to negatively impact academic and social outcomes in the long-term. Excessive screen time has proven to be an unhealthy habit that begins to develop in early childhood. Student self-esteem may be affected by extensive screen time. Self-esteem reflects the attitude towards the self and may contribute to mental health and social well-being. So that's why current study is done to find out the effect of screen time and physical activity. The current study is an exploratory survey, in which we ask from the participants by the help of self-made questionnaire to find about the issue mentioned in the current study. Data is collected through google forms which is send to participants by the help of social media e.g., WhatsApp, Facebook and E-mail. Data is analysed by the use of one sample proportion test. The result shows that the Null hypothesis is accepted. Hence we concluded that there is no effect of screen time on cognition in physiotherapy students.

Keywords: covid, physiotherapy, physical activity, cognition, screen time, online studies.

I. INTRODUCTION

Coronaviruses are enveloped viruses with a positive-sense single-stranded RNA genome belonging to the Corona viridae family, the Nidovirales order, and broadly distributed in humans and other mammals.[1] Although most human coronavirus infections are mild, the epidemics of the two beta-coronaviruses, severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) [2] caused more than 10,000 cumulative cases in the past two decades, respectively in 2002 and 2012, with mortality rates of 10% for SARS-CoV and 37% for MERS-CoV.[3] Since December 2019, a new zoonotic beta-corona virus (SARS-CoV-2) has spread all over the world from Wuhan, China [4] causing a disease known as coronavirus disease (COVID-19).

On 30 January 2020, the World Health Organization (WHO) declared a public health emergency [5] and the epidemic rapidly evolved into a pandemic by March 2020 [6], with a high number of cases in the European Region, especially in Italy [7]. SARS-CoV-2 is able to enter host cells through the binding between the viral structural spike (S) protein and the angiotensin-converting enzyme 2 (ACE2) receptor, present in the lung and in other tissues [8]. Viral entry is facilitated by a type 2 transmembrane serine protease, TMPRSS2, via the S protein [9]. Once binding between the S protein and receptor is established, the virus particles enter the host cell through membrane fusion and endocytosis. Inside the cell, the viral genome is released and translated into viral polypeptides, which are then cleaved into small products by proteases. The following stages include RNA synthesis by RNA-dependent RNA polymerase (RdRp), structural protein synthesis, exocytosis, and the release of the new assembled virions [8].

COVID-19 infection has a broad spectrum of severity ranging from an asymptomatic form to a severe acute respiratory syndrome that requires mechanical ventilation. The early presentation of COVID-19 infection is typically non-specific. Among symptomatic patients, about 80% showed a mild clinical course [10] characterized by a dry cough, sore throat, low-grade fever, or malaise; in 20% of cases, the general condition worsened in about seven days from the beginning of the symptoms, culminating in respiratory failure [11,12]. There are hundreds of viruses that belong to the coronavirus family. However, only six (229E, NL63, OC43, HKU1, SARS-CoV and MERS-CoV) have been reported to cause mild to severe respiratory tract infections in humans [13]. Among them are severe acute respiratory syndrome coronavirus (SARS-CoV) reported in November 2002 and middle east respiratory syndrome coronavirus (MERS-CoV) reported in

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September 2012, which emerged in human population from animal reservoirs and caused severe respiratory illness with high mortality rates [14,15]. Once again, a novel severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has emerged, and caused an infectious disease called coronavirus disease 2019 (COVID-19) [16].

The virus was first identified and reported from Wuhan city of China in December, 2019[17]. The SARS-CoV-2 is highly contagious, spread globally in a short period of time, and was declared a global pandemic by the World Health Organization on March 11, 2020 [18]. As of 18th April, 2020, 10:00am CEST; WHO reported more than 2.1 million confirmed cases of COVID-19, including 142,229 deaths in 213 countries, areas or territories [19]. The most-affected countries with more than 30,000 confirmed cases of SARS-CoV-2 are the United States of America, Spain, Italy, Germany, France, the United Kingdom, China, Iran, Turkey, Belgium, the Russian Federation, Canada and Brazil [19].

The coronavirus disease 2019 (COVID-19) pandemic has led to laws and policies that include national school closures, lockdown or shelter-in-place laws, and social-distancing recommendations that may translate to higher overall screen time among children and adolescents for the duration of the enforcement of these laws and policies. These policies may need to be periodically reinstated to control future COVID-19 recurrences or other national emergencies. Excessive screen time is associated with cardiovascular disease risk factor such as obesity, high blood pressure, and insulin resistance because it increases sedentary time and is associated with snacking.[20]

Screen time, defined operationally as time spent using computers, watching television or DVDs, and/or playing video games [21], Television, DVDs and other forms of screen media are common pastimes among young children in the United States. Despite the fact that the American Academy of Pediatrics recommends that parents avoid exposing children 2 and under to screen media, a nationally representative survey found that 68% of children under the age of 2 use screen media in a typical day, and that average screen time was 2.05 hours per day [22] In addition, children may be exposed to more time in front of the television in day care (an additional hour per day) and home-based childcare settings [23].

Children from lower socio-economic backgrounds may experience disproportionately high rates of screen media time. A study of young children participating in the Women, Infants and Children (WIC) program in New York State found that 82% of one year-old and 95% of two-year-olds watched television and videos on a typical weekday [24]. The average amount of screen time increased with age. One year-old spent an average of 10 hours per week watching TV/videos, while two-year-old spent approximately 15 hours per week watching TV/videos [24]. Additionally, of the total sample of 2-year-olds in this study, 43% watched more than 2 hours in a typical week-day. Other studies demonstrate that greater television watching in early childhood predicts increased television watching later in childhood [25].

High levels of screen time in early childhood also appear to negatively impact academic and social outcomes in the long-term [26]. Excessive screen time has proven to be an unhealthy habit that begins to develop in early childhood [27]. Researchers hypothesize that the link between obesity and television use in children and adolescents is a result of young people's decreased metabolic rates while watching TV, their decreased physical activity as a result of spending time in front of the screen, and their increased caloric intake, either because they eat while watching TV or because they eat in response to food advertisements on TV.[28] One of the more popular explanations of how screen time may be negatively influencing PA is the displacement hypothesis (4). The displacement hypothesis posits a symmetrical, zero-sum relationship in which the more time an individual devotes to screen time, the less time the individual will have to devote to PA [29]. Another tenet of the displacement hypothesis is that the finite nature of time budgets requires the introduction of new activities and behaviors to force out old activities and behaviors (32).

As screen time has increased over the past two decades, there has been a concomitant decrease in PA, contributing to an increased prevalence of obesity, especially in youth and adolescents [30],[31],[32] If screen time is somehow replacing PA, then this relationship may be explained by the displacement hypothesis. Specific to inactive college students, the displacement hypothesis postulates that an increase in sedentary behaviors, such as television viewing, computer usage, or video game playing, will be associated with a concomitant decrease in PA. Although the claims of the displacement hypothesis are often cited by many authors, empirical evidence supporting a negative relationship between PA and screen time is lacking [33]. How sedentary behaviors may influence PA has yet to be fully explained [34]. Television viewing has also been linked to a number of other important public health issues in youth including violent and aggressive acts, initiation of early sexual behaviors, body self-image issues and substance use and abuse.[35]

Additionally, children's self-esteem may be affected by extensive screen time. Self-esteem reflects the attitude towards the self and may contribute to mental health and social well-being [36]. "Time spent passively watching screen-based entertainment (TV, computer, mobile devices). This does not include active screen-based games where physical activity or movement is required." The WHO, therefore, does not include screen activities like exergaming, which has been credited with upending the stereotype of gaming as a sedentary activity [37]. Active Screen Time involves cognitively or physically engaging in screen-based activities, such as playing video games or completing homework on a computer.[38] Physically Active Screen Time Physically active video games have become increasingly popular and prevalent in recent years. With the advent of the Nintendo Wii™, Sony PlayStation Move™, and the XBOX Kinect™, active video games have become readily available and mainstream. Physically active games are comparable to physical exercise. Some are specifically designed to improve fitness (e.g., Wii Fit) but most are primarily designed to be entertaining, with exercise being a side-effect of play (e.g., Dance Central) (Lieberman et al., 2011). Playing active games has been shown to be

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similar in intensity to light to moderate walking, skipping and jogging (Maddison, Mhurchu, Jull, Prapavessis & Rodgers, 2007). Emerging research has also shown that active video games can improve academic performance and reduce classroom absenteeism, tardiness and negative classroom behavior (Lieberman et al., 2011).

Active video games can also be used to motivate young children to exercise and be more active outside of the game setting (Borja, 2006) and can improve group socialisation, bonds, mutual support and self-esteem (Lieberman et al., 2011). There is also evidence that children enjoy playing active video games more than traditional games in school physical education classes (Yeh-Lane, Moosbrugger, Liu & Arnold, 2011). Moreover, active video games are increasingly being used in the treatment of children with developmental disorders, such as autism spectrum disorder (Durkin, 2010). Video games have also been shown to help children undergoing chemotherapy or psychotherapy, children with emotional and behavioral problems (e.g., attention deficit disorder), and children with medical and health problems (e.g., muscular dystrophy) (Griffiths, 2003).[38]

Cognitively Active Screen Time There is a substantial body of research that illustrates the benefits of Active Screen Time in terms of cognitive skills and development. Computer use during the preschool years is associated with improvements in school readiness and cognitive development (Li & Atkins, 2004) and higher levels of attention and motivation (McCarrick & Li, 2007), while the instant feedback scaffolds children's interactions (Shute & Miksad, 1997). Computers facilitate social interaction and provide an environment for young children to use large amounts of language (McCarrick & Li, 2007) and improve word knowledge and verbal fluency (Shute & Miksad, 1997). Playing video games has been shown to enhance the capacity for visual attention and dynamic spatial skills (e.g., Boot, Kramer, Simons, Fabiani & Gratton, 2008) and improve problem-solving and inductive reasoning (Pillay, 2003). Playing video games can also lead to changes across sensory, perceptual and attentional abilities, resulting in improvements in contrast sensitivity, spatial resolution, attentional visual field, enumeration, multiple object tracking, and visuomotor coordination and speed (Spence & Feng, 2010).[38] Passive Screen Time involves sedentary screen-based activities and/or passively receiving screen-based information, such as watching TV or a DVD. There is some evidence that particular types of TV shows and DVDs (e.g. Sesame Street) are beneficial for pre-school-age children (e.g. Linebarger & Walker, 2005). However, children learn less from TV than from equivalent real-life experiences (Anderson & Pempek, 2005).[38]

Physical activity has a fundamental role in the prevention and treatment of chronic disease. The precise measurement of physical activity is key to many surveillance and epidemiological studies investigating trends and associations with disease. Public health initiatives aimed at increasing physical activity rely on the measurement of physical activity to monitor their effectiveness. Physical activity is multidimensional, and a complex behavior to measure; its various domains are often misunderstood. Inappropriate or crude measures of physical activity have serious implications, and are likely to lead to misleading results and underestimate effect size. In this review, key definitions and theoretical aspects, which underpin the measurement of physical activity, are briefly discussed. Methodologies particularly suited for use in epidemiological research are reviewed, with particular reference to their validity, primary outcome measure and considerations when using each in the field. It is acknowledged that the choice of method may be a compromise between accuracy level and feasibility, but the ultimate choice of tool must suit the stated aim of the research. A framework is presented to guide researchers on the selection of the most suitable tool for use in a specific study [39]. physical activity is a key component of recommendations to decrease morbidity and mortality [40]. Monitoring physical activity levels is important for surveillance and for assessing the effectiveness of interventions or public health initiatives aimed at increasing physical activity. Investigation of the dose–response relationship between physical activity and health outcomes is dependent on a reliable and valid responsive assessment of physical activity [41].

Assessing physical activity is fraught with difficulties as it is multidimensional, and no single method can capture all subcomponents and domains in the activity of interest. Crude measures of physical activity may have led to inconsistent and false-negative results for the association of physical activity (or inactivity) and disease risk in epidemiological studies [42]. Physical activity is a different concept to physical fitness [43]. although the two are often related. Physical activity has been defined as 'any bodily movement produced by skeletal muscles that results in caloric expenditure' [44]. Therefore, physical activity is commonly described by the following four dimensions: (i) frequency – 'the number of events of physical activity during a specific time period'; (ii) duration – 'time of participation in a single bout of physical activity'; (iii) intensity – 'physiological effort associated with participating in a special type of physical activity'; and (iv) type of activity [44]. Any assessment of physical activity should ideally measure all of these dimensions and account for day-to-day variation [45].

Exercise (or exercise training) is a component of leisure time physical activity, and is where planned, structured and repetitive bodily movements are performed to improve or maintain one or more components of physical fitness [44,46]. Regular physical activity (PA), fitness, and exercise are critically important for the health and wellbeing of people of all ages [47]. It is very clear that physical inactivity is a major contributor to mortality. The WHO reported that around 3.2 million deaths each year are attributable to physical inactivity.[48] Five leading risk factors for death are high blood pressure, smoking, high blood glucose, physical inactivity and obesity [49]. A glance at these risk factors reveals that high blood pressure and glucose levels as well as obesity are connected with physical inactivity [50]. For people without

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a mobility limitation, time spent in sedentary activities (such as watching TV) and light activities (including light house-work) does not reach activity levels high enough to improve health outcomes [52].

In addition to positive physical effects of increasing physical activity there is a growing body of evidence indicating cognitive benefits. A Cochrane systematic review of the effect of aerobic exercise on cognition in people over the age of 55 years showed a positive effect, improving auditory attention and cognitive processing speed [53]. Research findings about the association of exercise with cognitive impairment are suggestive of benefit, but not unequivocal. Paterson et al [54] review of the effects of exercise on cognition concluded that although the data look promising, information about the specific dose and type of exercise is as yet unknown and further research needs to be undertaken. There are some promising indications that moderate level exercise reduces the risk of developing cognitive impairment in older adults, [55,56]and that for people with mild cognitive deficits, there may be a protective effect of exercise [56].

Cognition refers to "the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses"[57]. It encompasses many aspects of intellectual functions and processes such as: perception, attention, thought, the formation of knowledge, memory and working memory, judgment and evaluation, reasoning and "computation", problem solving and decision making, comprehension and production of language. Cognitive processes use existing knowledge and discover new knowledge. Cognitive processes are analyzed from different perspectives within different contexts, notably in the fields of linguistics, musicology, anesthesia, neuroscience, psychiatry, psychology, education, philosophy, anthropology, biology, systemics, logic, and computer science [58].

Cognitive psychology is the branch of psychology that focuses on internal states, such as motivation, problem-solving, decision-making, thinking and attention. This area of psychology has continued to grow since it began taking hold in the 1960s. [59] Cognitive psychology deals mainly with the study of the processes and products of the growth and development of cognitive abilities and capacities of the human beings. It studies the behavior of the individuals in relation to the development of his cognitive strengths and their use in the challenging circumstances. It emphasizes the role of one's cognitive abilities like reasoning and thinking, analysis and synthesis, inferring and generalizing, intelligence and insight, etc. in the process of learning, problem-solving, creative output, adjustment, etc. The experts dealing with the study of the branch are named as cognitive psychologists [60].

Cognitive Route Is a Message Can appeal to an individual's cognitive evaluation to help change an attitude. In the central route to persuasion the individual is presented with the data and motivated to evaluate the data and arrive at an attitude changing conclusion. In the peripheral route to attitude change, the individual is encouraged not to look at the content but at the source. This is commonly seen in modern advertisements that feature celebrities. In some cases, physicians, doctors or experts are used. In other cases, film stars are used for their attractiveness [61]. An increasing number of children and adolescent in the Western world does not meet the health promoting physical activity (PA) recommendations [62]. The decrease in PA in our everyday life is related to many chronic diseases and risk factors such as type 2 diabetes mellitus and obesity even in children [63], but growing evidence indicates that an increase in physical activity may enhance cognitive functions at least in older adults [64]. However, more research is needed on looking at the associations of PA with cognition and academic performance in children.

In addition to remarkable benefits on cardiovascular health, PA is known to have positive effects on brain health and function [65]. PA is recently found to be a counter regulator against cognitive decline due to Alzheimer´s disease [66] and it may prevent vascular dementia due to atherosclerotic changes in cerebral vasculature in older adults [67]. PA is also associated with improved cognition [68]. and certain measures of academic skills in children [69]. In addition to regular physical training, single bouts of physical exercise are associated with enhanced neuro-electrical processes in the cortex and with improved cognitive control [70,71] in adults and in children. Single exercise bouts may also contribute to neural protection and synaptic plasticity due to increased levels of the brain-derived neurotrophic factor (BDNF) [72].

In the view of public health, it is reasonable to support children´s cognitive development and academic performance with increasing daily PA. As childhood obesity is today more prevalent in the Western countries than a few decades ago [73,74]. effective interventions for preventing and treating overweight and obesity are needed. Evidence from the controlled training studies suggests that PA decreases adiposity in overweight and obese children and may prevent weight gain in normal weight children [75]. Additionally, a number of studies show that childhood obesity is associated with poor academic performance and cognitive function in children and adolescents [76,77]. Also reversed associations between academic achievement and obesity have been found.

A recent study suggests that poor academic performance through childhood to adolescence is associated with obesity among middle-aged Finnish women [78]. Thus, participating in physical activities during childhood may support cognitive development and enhance academic performance in childhood by improving cognitive functions or preventing overweight and obesity. However, it is not proved that PA interventions designed to enhance cardiometabolic health in children and adolescents are associated with improvements in cognitive functions and academic performance.

Physiotherapy is a very dynamic health care profession. Physiotherapy is a well-recognized profession worldwide. Physiotherapy techniques and treatment helps in the management of various impairments and disabilities. Physiotherapy can be used to treat various conditions from Pediatric age group to geriatric age group. Physiotherapy management techniques can be used in all specialties include: Orthopedics, Neurology, Cardio-Respiratory, Obstetrics & Gynecology.

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In the time of 1st world war Physiotherapy took a firm base [80]. Physiotherapy is a healthcare profession concerned with human function and movement and maximizing potential, it uses physical approaches to promote, maintain and restore physical, psychological and social well-being, taking account of variations in health status. It is science-based, committed to extending, applying, evaluating and reviewing the evidence that underpins and informs its practice and delivery. The exercise of clinical judgement and informed interpretation is at its core (CSP 2002b) [81]. "Physiotherapy is a branch of medical health care practiced by a qualified physiotherapist who assesses, evaluates, diagnoses and renders the treatment to the patients suffering from diseases related to orthopedics, neurology, chest, pediatrics, gynecology, geriatrics, nephrology, cancer, sports, post cardio thoracic surgery, general surgery, etc. using physical modalities like heat therapy, cold therapy, exercise therapy, massage therapy, and manipulative therapy, in order to alleviate the pain and bodily malfunction and to make the patients functionally independent"[82].

According to the Indian Association of Physiotherapist, physiotherapy is defined as an allied health profession practiced by a physiotherapist who uses various physical modalities to reduce pain and other bodily malfunction [83]. According To AMERICAN PHYSICAL THERAPY ASSOCIATION, Physical therapists are good people to know. They are educated in understanding the interaction of all your body parts. Their hands-on approach begins with examination, diagnosis, and treatment of the immediate problem. Then they teach you how to take care of yourself by showing you how to do exercises and how to use your body properly to gain strength and mobility and prevent recurring injury. You will find them advising on proper posture and body motion in the workplace, treating injuries, consulting on fitness, and administering physical therapy in the home. Today, physical therapists provide help for every part of the body to everyone from infants to the elderly-more than 1 million people every day![84]. Physical therapy, the model definition the Board of Directors of the American Physical Therapy Association (APTA) adopted the model definition of Physical Therapy for state practice act in March 1993 and further revised in March 1995 as Physical therapy, which is the care and service provided by or under the direction and supervision of a physical therapist, includes:

1. Examining patients with impairments, functional limitations and disability or other health-related conditions to determine a diagnosis, prognosis and intervention. Examination within the scope of physical therapy practice include, but are not limited to, tests and measures of the musculoskeletal system (e.g., range of motion, manual muscle test, joint mobility, posture), neurologic system (e.g., reflexes, cranial nerve integrity, neuromotor development, sensory integrity), cardiopulmonary system (e.g., integumentary integrity).
2. Alleviating impairments and functional limitations by designing, implementing and modifying therapeutic interventions. Interventions include, but are not limited to, therapeutic exercise; manual therapy; prescription, fabrication and application of assistive, adaptive, supportive and protective devices and equipment; airway clearance techniques; physical agents and mechanical and electrotherapeutic modalities and patient education.
3. Preventing injury, impairments, functional limitations and disability, maintenance of fitness, health and quality of life in all age population [84].

It uses physical approaches to promote, maintain and restore physical, psychological and social well-being, taking account of variations in health status. It is science-based committed to extending, applying, evaluating and reviewing the evidence that underpins and informs its practice and delivery. The exercise of clinical judgment and informed interpretation is at its core [85].

In India, the first school & Centre for Physiotherapy was established at Mumbai in 1957 with technical support by World Health Organization [86]. The practice of physiotherapy has come into picture at the time of the Second World War when the injured soldiers were given physical means of treatment. Gradually, a few universities started to offer diploma courses (one year) in physiotherapy abroad and in India. The duration of the course was later increased to three years. In 1970s, foreign universities started to offer clinical-oriented degree courses in physiotherapy. Many countries including India later adopted this. The Bombay University was one of the first universities to offer a degree course in physiotherapy. Gradually, many universities in South India started offering degree courses. Today, there are many colleges in Tamil Nadu, Kerala, Karnataka and Andhra Pradesh offering 4 years degree program in physiotherapy. Likewise, Maharashtra, West Bengal, Madhya Pradesh, Delhi and a few other states also offer this program. Today, a stage has come where a physiotherapy graduate can reach up to super specializations level by selecting a branch of his/her interest.

Today, physiotherapy is considered as allied health profession. The degree program in physiotherapy prepares physiotherapists who are skillful and willing to learn and who have a research and development-oriented approach to their work. There is tremendous research being carried out abroad and in India to make it as an evidence-based practice. Physiotherapy has its role in every branch of medicine and surgery involving patients from all age groups. They have the capacities to work as experts in individual and community rehabilitation questions in different working contexts. The aim of physiotherapy is to promote the humans physical and functional capacities and thus to promote/maintain human welfare in cooperation with other instances.

Physiotherapists can practice independently without prior medical referral. Graduate physiotherapists are aware of their professional, ethical and financial responsibilities and are able to theoretically justify their activity [87]. Standards of Physiotherapy Practice is written in a way that offers a broad statement of intent (the Standard statement), which is followed by a number of measurable statements about expected performance or activity by the physiotherapist, student

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or assistant (known as criteria'). For example, Core Standard 2 states Patients are given relevant information about the proposed physiotherapy procedure, taking into account their age, emotional state and cognitive ability. to allow informed consent. The criteria for this standard include: the patient's consent is obtained before starting any examination/treatment options, including significant benefits, risks and side-effects, are discussed with the patient, the patient is given the opportunity to ask questions the patient is informed of the right to decline physiotherapy at any stage without that prejudicing future care the patient's consent to the treatment plan is documented in the patient's record. These measurable criteria allow performance to be assessed against them, through clinical audit, described in more detail later.

The content of this standard and accompanying criteria set out the specific actions required in order to conform, in this case, to an aspect of Rule 2 of Rules of Professional Conduct: "Chartered physiotherapists shall respect and uphold the rights, dignity and individual sensibilities of every patient, which includes guidance. on informed consent. This is a good example of how the Standards and Rules complement each other. They should be used together to ensure compliance with the characteristics and actions required of members of the physiotherapy profession [88].

Every physiotherapist has her or his own personal 'scope of practice' (CSP 2002a)- that is, a range (or scope) of professional knowledge and skills that can be applied competently within specific practice settings or populations. When a person is newly qualified, this scope will be based on the content of the pre-qualifying Curriculum Framework, but will also be informed by the individual's experience in clinical placements, and the amount of teaching and reflective learning that has been possible as part of those placements.

As a career progresses, and as a result of CPD, some physiotherapists will become competent in highly skilled areas such as intensive care procedures, or splinting for children with cerebral palsy, which are unlikely to have been taught pre-qualifying. Others will extend their skills in areas in which they already had some experience, for example dealing with people with neurological problems. Others will enhance their communication and life skills, as well as refining their physiotherapy skills by, for example, working with elderly people or people with learning difficulties. It is the responsibility of the professional to understand his or her personal scope of practice as it changes and evolves throughout a career. To practise in areas in which you are not competent puts patients at risk and is a breach of the CSP's Rules of Professional Conduct [89].

The main concern of physiotherapy is rehabilitation which is defined as “The restoration of an individual part or parts back to normal or near normal function after a disabling disease, injury, addiction or incarceration [90]. In recent days, though the awareness about the Physiotherapy profession is increasing, still the complete awareness is not achieved. The common myths prevailing among the people are Physiotherapy treatment is commonly used in musculoskeletal conditions. Physiotherapist uses mainly electro modalities. The above myths may under estimate the scope of the profession and practice [91].

II. MATERIAL & METHODOLOGY

Ethical statement: The web-based open E-survey research is submitted and Approved by the ethics committee of Saaii college, Kanpur. we ensured that the study was performed according to the principles laid by, declaration of Helsinki (Revised 2013), Council for International Organizations of Medical Sciences (CIOMS) guidelines, International ethical guidelines for health-related research involving humans (2016) and National guidelines for biomedical and health research involving human participants (2017).

Sample and design: A cross-sectional online survey was sent to physiotherapy students during COVID-19 lockdown period in the month of March 2021 and June 2021!), Students who are pursuing Physiotherapy course.

Survey development: A series of questionnaires were created for the survey. The Survey contained three sections. The first section contains a consent form, the second section include Demographic data and the third section of survey comprised questions about cognitive function and physical activity.

Administration of survey: The study was executed by sending the online link (https://forms.gle/Wr4zotcH1YD7pQ7M8) to the Physiotherapy students through social networking sites such as Facebook, WhatsApp, and Instagram. 150 potential participants were identified and E-survey link was sent to them through the messaging services. The Survey was administered using the online survey portal, Google forms. As people are mostly active on social networking sites and messengers when compared to frequent checking e-mails, social networking sites were used for circulating the survey questionnaire. The reminder survey link was sent to them, if response was not received within a period of two weeks. Web-based open E-survey is cost-effective, eco-friendly, time-saving and practically feasible during the COVID-19 period.

Sample size: The sample size for this cross-sectional study was 150, in which only 142 responses we get. when the survey responses hit 142 and time limit is exceeding the web based open E-survey link has closed for accepting further responses and analysed.

Data collection procedure: The data was collected from the physiotherapy students by sending the link of google form through mail, WhatsApp and Facebook. 150 potential participants were identified and E-survey link was sent to them through the messaging services and time taken by each survey to fill approximately 10 – 15 minutes.

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III. ANALYSIS

Data analysis was done using IBM SPSS Statistics (software package used for statistical analysis 2019 version - 26). One sample proportion test is used in the analysis of this study, to test hypothesis; which help to determine whether to reject or accept Null hypothesis.

Total Consent for Participation=150

Total Successful Participants in Survey=142

Total Unsuccessful Participants in Survey=08

Table-1: Age wise distribution of the Participants

Age group (In Yrs)	Number of Participants	Participants %
Under 21	16	11.27
21-25	101	71.12
26-30	25	17.61
Total	142	

Table-2: Gender wise distribution of the Participants

Gender	Number of Participants	Participants %
Male	74	52.11
Female	68	47.89
Other	0	0
Total	142	

Table-3: Screen time wise distribution of the Participants

Qualification	Number of Participants	Participants %
1-2 hours	15	10.6
2-4 hours	40	28.16
4-6 hours	56	39.41
6-8 hours	31	21.83
Total	142	

Table-4: Physical activity wise distribution of the Participants

Occupation	Number of Participants	Participants %
10 min.	31	21.83
10-20 min.	22	15.5
20-30 min.	35	24.64
30-40 min.	54	38.03
Total	142	

Table-5: Do the Participants fail to notice the signpost on the road.

Category	Number of Participants	Participants %
Never	54	38.1
Less often	37	26
Often	26	18.3
Most often	18	12.7
Very often	7	4.9
Total	142	

Table-6: Do the Participants bump into people.

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Category	Number of Participants	Participants %
Never	73	51.4
Less often	32	22.5
Often	19	13.3
Most often	10	7
Very often	8	5.8
Total	142	

Table-7: Do the Participants forget to turned off light or locked the door.

Category	Number of Participants	Participants %
Never	45	31.7
Less often	32	22.5
Often	36	25.3
Most often	11	7.8
Very often	18	12.7
Total	142	

Table-8: Do the Participants loose temper and regret it.

Category	Number of Participants	Participants %
Never	36	25.3
Less often	34	23.9
Often	31	21.8
Most often	28	19.7
Very often	13	9.3
Total	142	

Table-9: Do the Participants have trouble in making up mind.

Category	Number of Participants	Participants %
Never	37	26
Less often	30	21.1
Often	34	23.9
Most often	20	14.1
Very often	21	14.9
Total	142	

Table-10: Do the Participants forget appointment.

Category	Number of Participants	Participants %
Never	62	43.7
Less often	28	19.7
Often	25	17.6
Most often	15	10.6
Very often	12	8.4
Total	142	

Table-11: Do the Participants forget people's name.

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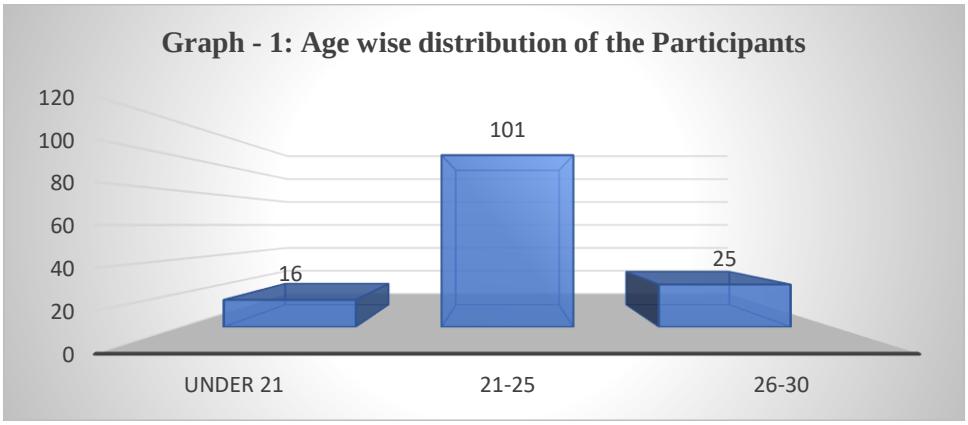
Category	Number of Participants	Participants %
Never	40	28.2
Less often	28	19.7
Often	36	25.3
Most often	19	13.4
Very often	19	13.4
Total	142	

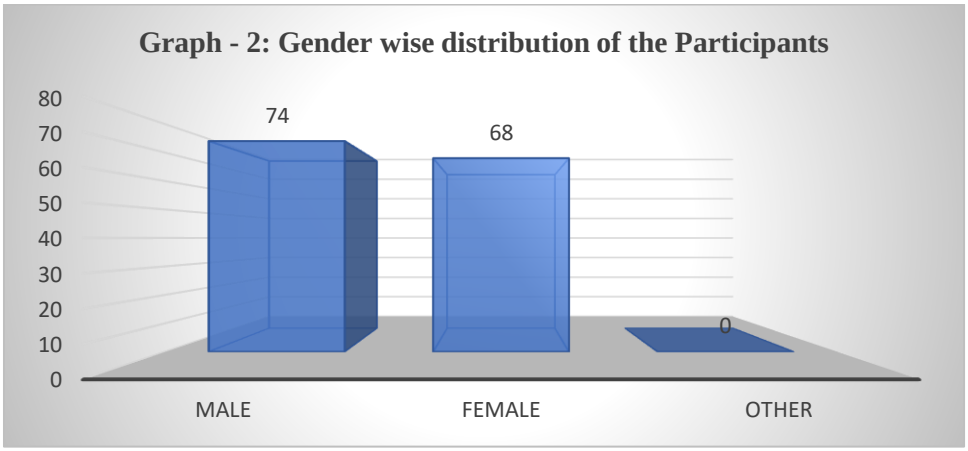
Table-12: Do the Participants drop things.

Category	Number of Participants	Participants %
Never	43	30.4
Less often	42	29.6
Often	29	20.4
Most often	14	9.8
Very often	14	9.8
Total	142	

IV. RESULT



Graph – 1: Represents the age wise distribution of all 142 participants, all age groups are mentioned in years. The result suggests that 11.27% of participants (16 out of 142 participants) belongs to age group under 21 years, 71.12% of participants (101 out of 142 participants) belongs to age group 21 – 25 years, 17.61% of participants (25 out of 142 participants) belongs to age group 26 - 30 years, it reflects that maximum participant belong to age group 21 – 25 years.



Graph-2: Represents the Gender wise distribution of the all 142 participants, the result suggests that 52.11% of participants are Male (74 out of 142 participants), 47.89% of participants are female (68 out of 142 participants) & 0% of participants are other (No participants out of 142 participants), It reflects that maximum participant are male.

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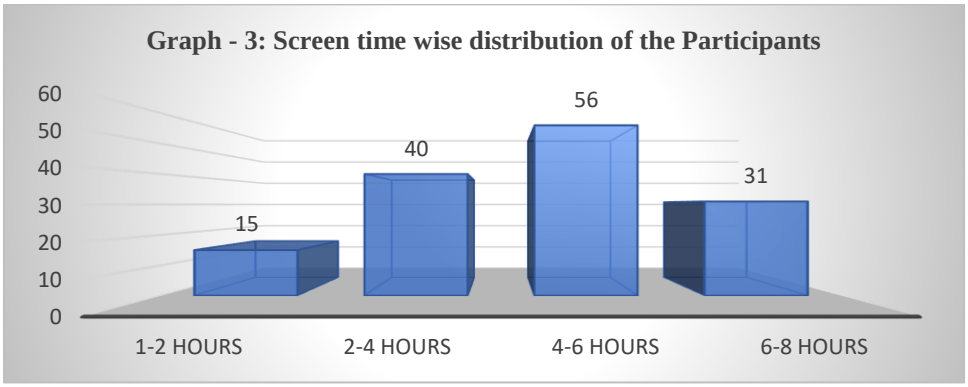
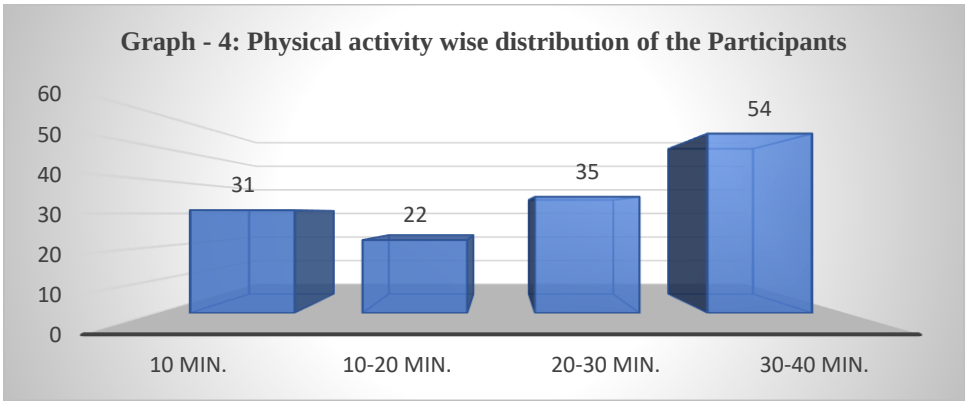
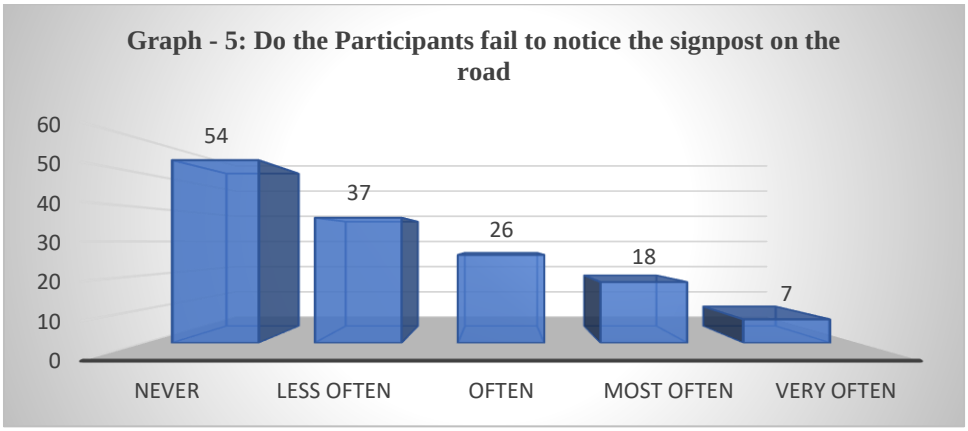


Graph-3: Represents the screen time wise distribution of the all 142 participants, the result suggests that 10.6% of participants screen time is 1-2 hours (15 out of 142 participants), 28.16% of participants screen time is 2-4 hours (40 out of 142 participants), 39.41% of participants screen time is 4-6 hours (56 out of 142 participants) & 21.83% of participants screen time is 6-8 hours. It reflects that maximum participant screentime are 4-6 hours.



Graph – 4: Represents the physical activity wise distribution of all 142 participants. The result suggests that 21.83% of participants (31 out of 142 participants) are doing physical activity for 10 min, 15.5% of participants (22 out of 142 participants) are doing physical activity for 10-20 min, 24.64% of participants (35 out of 142 participants) are doing physical activity for 20-30 min, 38.03% of participants (54 out of 142 participants) are doing physical activity for 30-40 min, it reflects that maximum participant are doing physical activity 30-40 min.



Graph-5: Represents failure of participants to notice signpost on the road wise distribution of the all 142 participants, the result suggests that 38.1% of participants (54 out of 142 participants) never fail to notice the signpost on the road, 26% of participants (37 out of 142 participants) less often fail to notice the signpost on the road, 18.3% of participants (26 out of 142 participants) often fail to notice the signpost on the road, 12.7% of participants (18 out of 142 participants)

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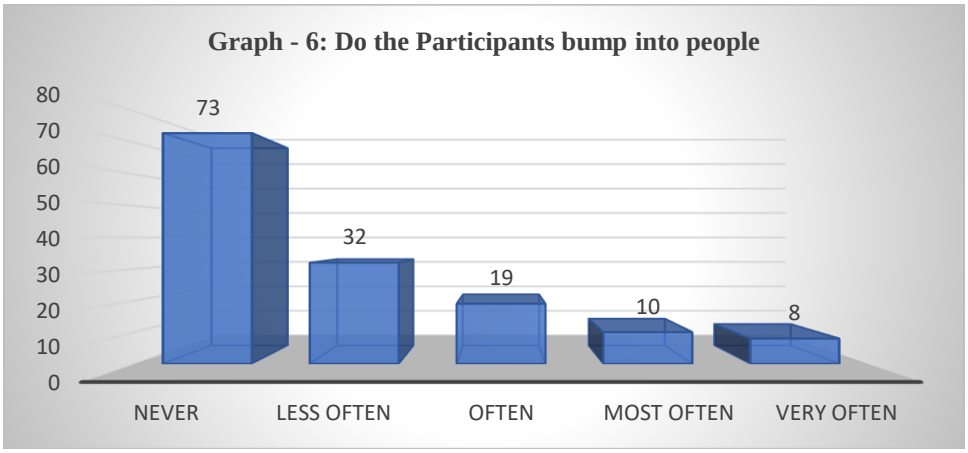
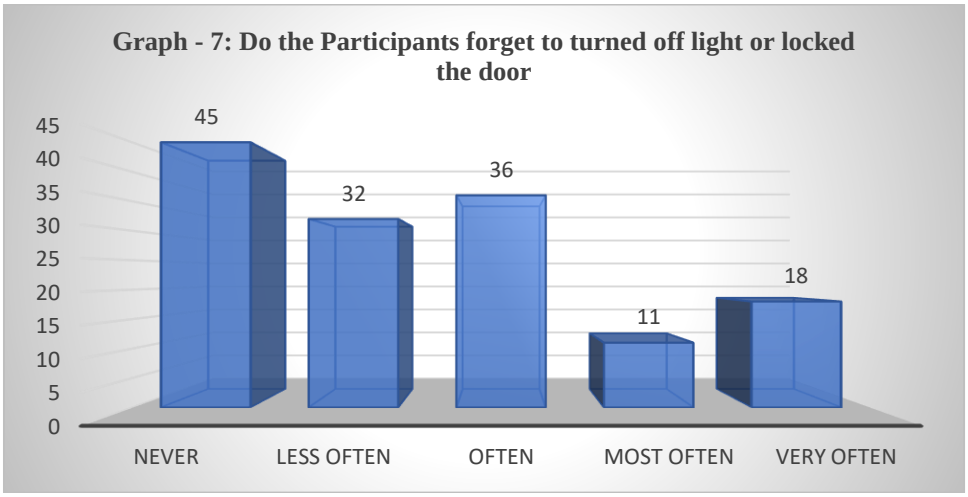
most often fail to notice the signpost on the road & 4.9% of participants (7 out of 142 participants) very often fail to notice the signpost on the road, It reflects that maximum participant never fail to notice the sign post on the road.



Graph-6: Represents participants bumping into people wise distribution of the all 142 participants, the result suggests that 51.4% of participants (73 out of 142 participants) never bump into people, 22.5% of participants (32 out of 142 participants) less often bump into people, 13.3% of participants (19 out of 142 participants) often bump into people, 7% of participants (10 out of 142 participants) most often bump into people & 5.8% of participants (8 out of 142 participants) very often bump into people, It reflects that maximum participant never bump into the people.



Graph – 7: Represents that participant forget to turned off light or locked the door wise distribution of all 142 participants. The result suggested that 31.7% of participants (45 out of 142 participants) never forget to turned off light or locked the door, 22.5% of participants (32 out of 142 participants) less often forget to turned off light or locked the door, 25.3% of participants (36 out of 142 participants) often forget to turned off light or locked the door, 7.8% of participants (11 out of 142 participants) most often forget to turned off light or locked the door, 12.7% of participants (18 out of 142 participants) very often forget to turned off light or locked the door, It reflects that maximum participants never forget to turned off light or locked the door.

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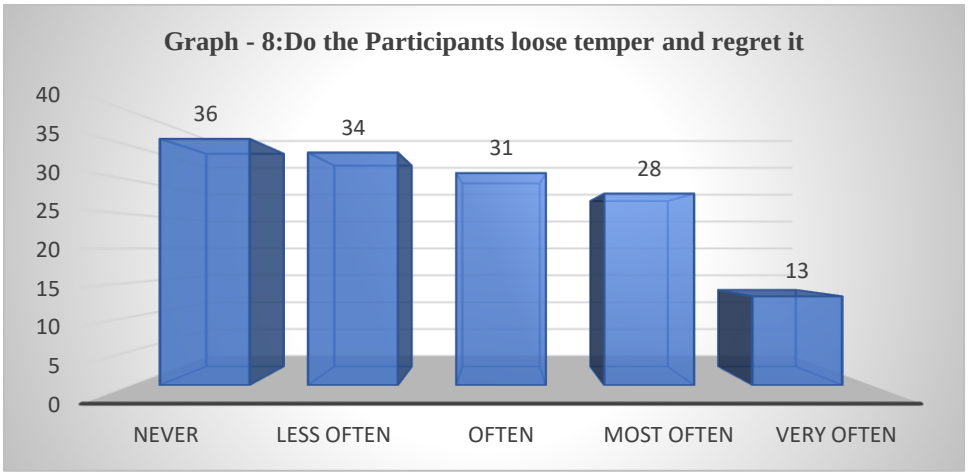
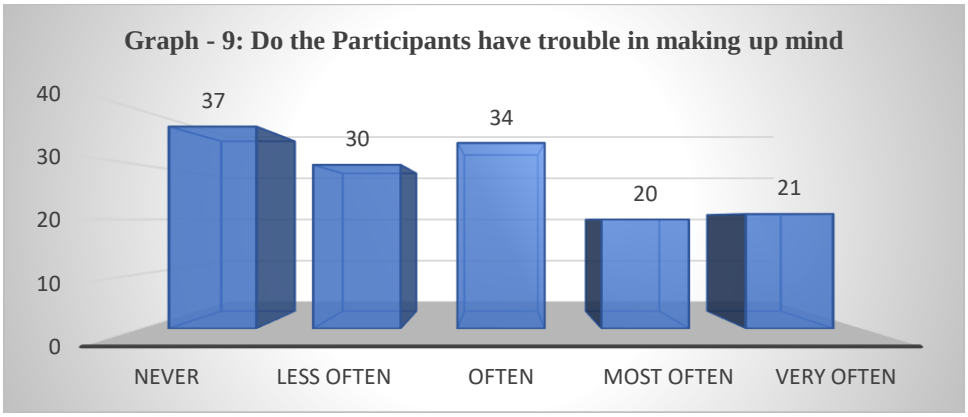
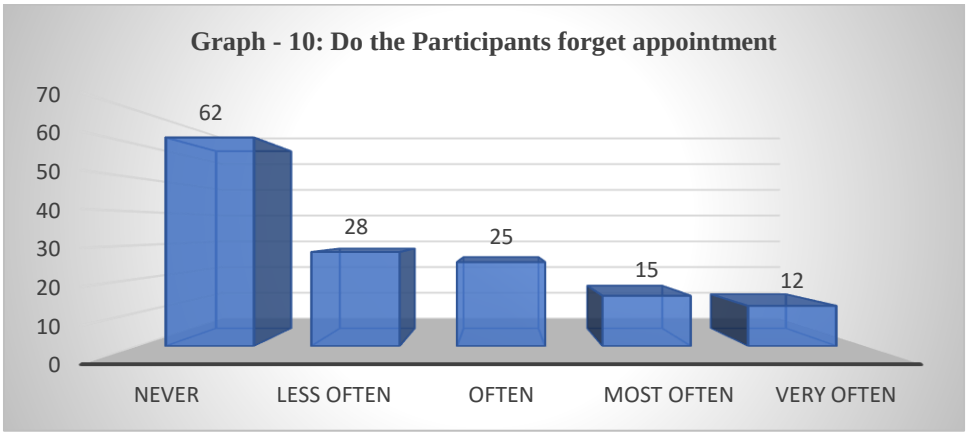


Graph – 8: Represents that participant loose temper and regret it wise distribution of all 142 participants. The result suggested that 25.3% of participants (36 out of 142 participants) are never loose temper and regret it, 23.9% of participants (34 out of 142 participants) are less often loose temper and regret it, 21.8% of participants (31 out of 142 participants) are often loose temper and regret it, 19.7% of participants (28 out of 142 participants) are most often loose temper and regret it, 9.3% of participants (13 out of 142 participants) are very often loose temper and regret it, It reflects that maximum participants never loose temper and regret it.



Graph – 9: Represents participants having trouble in making up mind wise distribution of all 142 participants. The result suggested that 26% of participants (37 out of 142 participants) are never having trouble in making up mind, 21.1% of participants (30 out of 142 participants) are less often having trouble in making up mind, 23.9% of participants (34 out of 142 participants) are often having trouble in making up mind, 14.1% of participants (20 out of 142 participants) are most often having trouble in making up mind, 14.9% of participants (21 out of 142 participants) are very often having trouble in making up mind. It reflects that maximum participant are never having trouble in making up mind.



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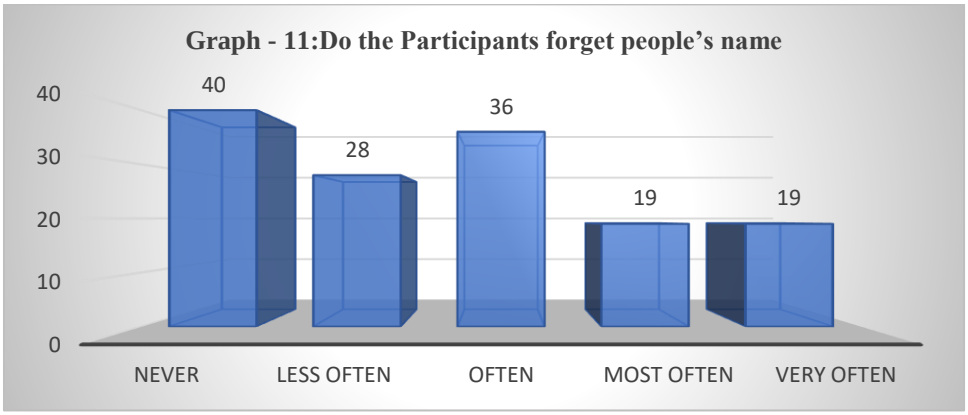
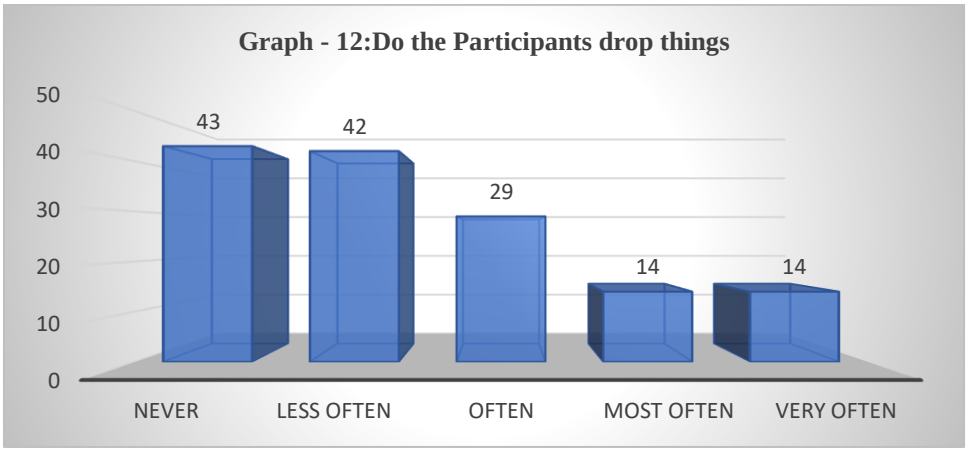
Graph – 10: Represents participants forgot appointment wise distribution of all 142 participants. The result suggested that 43.7% of participants (62 out of 142 participants) are never forget appointment, 19.7% of participants (28 out of 142 participants) are less often forget appointment, 17.6% of participants (25 out of 142 participants) are often forget appointment, 10.6% of participants (15 out of 142 participants) are most often forget appointment, 8.4% of participants (12 out of 142 participants) are very often forget appointment. It reflects that maximum participant are never forget the appointment.



Graph – 11: Represents participants forgot people's name wise distribution of all 142 participants. The result suggested that 28.2% of participants (40 out of 142 participants) are never forget people's name, 19.7% of participants (28 out of 142 participants) are less often forget people's name, 25.3% of participants (36 out of 142 participants) are often forget people's name, 13.4% of participants (19 out of 142 participants) are most often forget people's name, 13.4% of participants (19 out of 142 participants) are very often forget people's name. It reflects that maximum participant are never forget the people's name.



Graph – 12: Represents participants drop things wise distribution of all 142 participants. The result suggested that 30.4% of participants (43 out of 142 participants) are never drop things, 29.6% of participants (42 out of 142 participants) are less often drop things, 20.4% of participants (29 out of 142 participants) are often drop things, 9.8% of participants (14 out of 142 participants) are most often drop things, 9.8% of participants (14 out of 142 participants) are very often drop things. It reflects that maximum participant are never drop things.

V. CONCLUSION

Hence, we concluded that over all based-on result of this study and previous researches, it can be said that the study An Effect of Screen Time and Physical Activity on cognition in physiotherapy students due to Online Studies as we concluded that –

1. Maximum number of participants belong to age group 22 – 30 years.
2. Maximum number of participants are Male.
3. Maximum number of participants screentime are 4-6 hours.

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4. Maximum number of participants are doing physical activity 30-40 min.
5. Maximum number of participants never fail to notice the sign post on the road.
6. Maximum number of participants never bump into the people
7. Maximum number of participants never forget to turned off light or locked the door.
8. Maximum number of participants never loose temper and regret it.
9. Maximum number of participants are never having trouble in making up mind.
10. Maximum number of participants are never forgetting the appointment.
11. Maximum number of participants are never forgetting the people's name.
12. Maximum number of participants are never drop things.

VI. DISCUSSION

To determine An Effect of screen time and physical activity on cognition in physiotherapy students due to online studies, we conducted Cross sectional simple randomized online survey among the physiotherapy students. We received 142 feedbacks with consent based on inclusion & exclusion criteria.

In question 1 we asked age of participants, we found that maximum participants belong to age group 21-25 years which represents the age wise distribution of all 142 participants, all age groups are mentioned in years, the result suggests that 11.27% of participants (16 out of 142 participants) belongs to age group under 20 years, 71.12% of participants (101 out of 122 participants) belongs to age group 21 – 25 years, 17.61% of participants (25 out of 142 participants) belongs to age group under 26 - 30 years.

In question 2 we asked about gender of the participants, we found maximum participants were male, which represents the gender wise distribution of all the 142 participants, the result suggests that 52.11% of participants are Male (74 out of 142 participants), 47.89% of participants are female (68 out of 142 participants) & 0% of participants are other (No participants out of 142 participants).

In question 3 we asked about screen time of the participants, we found maximum number of participants screen time were 4-6 hours, which represents the screen time wise distribution of all 142 participants, the result suggests that 10.6% of participants screen time is 1-2 hours (15 out of 142 participants), 28.16% of participants screen time is 2-4 hours (40 out of 142 participants), 39.41% of participants screen time is 4-6 hours (56 out of 142 participants) & 21.83% of participants screen time is 6-8 hours.

In question 4 we asked about physical activity of the participants, we found maximum number of participants physical activity were 30-40 min, which represents the physical activity wise distribution of all 142 participants, the result suggests that 21.83% of participants (31 out of 142 participants) are doing physical activity for 10 min, 15.5% of participants (22 out of 142 participants) are doing physical activity for 10-20 min, 24.64% of participants (35 out of 142 participants) are doing physical activity for 20-30 min, 38.03% of participants (54 out of 142 participants) are doing physical activity for 30-40 min.

In question 5 we asked about the failure of participants to notice signpost on the road, we found maximum number of the participants never failed to notice signpost on the road, which represent the failure of participants to notice signpost on the road. the result suggests that 38.1% of participants (54 out of 142 participants) never fail to notice the signpost on the road, 26% of participants (37 out of 142 participants) less often fail to notice the signpost on the road, 18.3% of participants (26 out of 142 participants) often fail to notice the signpost on the road, 12.7% of participants (18 out of 142 participants) most often fail to notice the signpost on the road & 4.9% of participants (7 out of 142 participants) very often fail to notice the signpost on the road

In question 6 we asked Do patients bump into the people, the results suggest that 51.4% of participants (73 out of 142 participants) are never bump into the people, 22.5% of participants (32 out of 142 participants) are less often bump into the people, 13.3% of participants (19 out of 142 participants) are often bump into the people, 7% of participants (10 out of 142 participants) are most often bump into the people, and 5.8% of participants (8 out of 142 participants) are very often bump into the people.

In question 7 we asked Do participant forget to turned off light or locked the door, the results suggests that 31.7% of participants (45 out of 142 participants) are never forget to turned off light or locked the door, 22.5% of participants (32 out of 142 participants) are less often forget to turned off light or locked the door, 25.3% of participants (36 out of 142

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participants) are often forget to turned off light or locked the door, 7.8% of participants (11 out of 142 participants) are most often forget to turned off light or locked the door, 12.7% of participants (18 out of 142 participants) are very often forget to turned off light or locked the door.

In question 8 we asked Do the participant loose temper and regret it, and the results suggest that 25.3% of participants (36 out of 142 participants) are never loose temper and regret it, 23.9% of participants (34 out of 142 participants) are less often loose temper and regret it, 21.8% of participants (31 out of 142 participants) are often loose temper and regret it, 19.7% of participants (28 out of 142 participants) are most often loose temper and regret it, 9.3% of participants (13 out of 142 participants) are very often loose temper and regret it.

In question 9 we asked Do the participants have trouble in making up mind, the results suggest that 26% of participants (37 out of 142 participants) are never have trouble in making up mind, 21.1% of participants (30 out of 142 participants) are less often have trouble in making up mind, 23.9% of participants (34 out of 142 participants) are often have trouble in making up mind, 14.1% of participants (20 out of 142 participants) are most often have trouble in making up mind, 14.9% of participants (21 out of 142 participants) are very often have trouble in making up mind.

In question 10 we asked Do the participants forgot appointment, the results suggest that 43.7% of participants (62 out of 142 participants) are never forgot appointment, 19.7% of participants (28 out of 142 participants) are less often forgot appointment, 17.6% of participants (25 out of 142 participants) are often forgot appointment, 10.6% of participants (15 out of 142 participants) are most often forgot appointment, 8.4% of participants (12 out of 142 participants) are very often forgot appointment.

In question 11 we asked Do the participants forgot people's name, the results suggest that 28.2% of participants (40 out of 142 participants) are never forgot people's name, 19.7% of participants (28 out of 142 participants) are less often forgot people's name, 25.3% of participants (36 out of 142 participants) are often forgot people's name, 13.4% of participants (19 out of 142 participants) are most often forgot people's name, 13.4% of participants (19 out of 142 participants) are very often forgot people's name.

In question 12 we asked Do the participants drop things, the results suggest that 30.4% of participants (43 out of 142 participants) are never drop things, 29.6% of participants (42 out of 142 participants) are less often drop things, 20.4% of participants (29 out of 142 participants) are often drop things, 9.8% of participants (14 out of 142 participants) are most often drop things, 9.8% of participants (14 out of 142 participants) are very often drop things.

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