EFFECT OF DISPLAY SCREEN EXPOSURE ON THE REFRACTIVE ERROR AND THE EFFECTIVENESS OF CUSTOM SPECTACLE AND READY-MADE SPECTACLE INTERVENTIONS IN IMPROVING VISUAL ACUITY AMONG SCHOOL CHILDREN IN URBAN SETTING IN MYANMAR

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ABSTRACT

Refractive error(RE) is a very common eye disorder resulting in impaired vision in 2.6 billion people globally. It is particularly affecting schoolchildren. Among different types of RE, myopia is the major cause. Increased screen time has recently been assumed as a potential risk factor for eye health problems. At the same time, the prevalence of RE among schoolchildren was seen in an increasing trend worldwide. Similarly, Myanmar schoolchildren had much access to various screens. The objectives of this mixed-methods study were; to determine the association of display screen exposure and RE among school children, the feasibility of establishing a school-based vision care program, and the effectiveness of spectacles provision interventions to correct RE. In the first phase of the study, a cross-sectional study was conducted to determine the association of display screen exposure on RE among 2500 schoolchildren aged 8-16 years in seven Basic Education schools in two urban townships in the Yangon Region from January to May 2020. It was followed by a qualitative study conducted among school children, school teachers, optometrists, and ophthalmologists regarding the feasibility to establish a school-based vision care program. The second phase of the study was conducted from January to May 2020 in the same schools. It was a non-inferiority double-blind randomized clinical trial(RCT) to compare visual acuity improvement and to determine the cost-effectiveness of Ready Made Spectacles (RMS) and Custom Spectacles (CS) provision intervention which was conducted with 250 participants on each arm. For quantitative data analysis, Stata version 15.0 was used and for the qualitative data analysis, the grounded theory was applied. Results from the cross-sectional study showed that one out of ten participants had RE in which myopia was the most prevalent RE type with 71%. Approximately 70% of all participants had daily exposure to digital display screens; smartphones or tablets. The majority of participants were long-term digital screen users. The risk of RE has been found greater amongst those exposed to screen time for over 2 hours per day compared to those who did not expose, OR= 1.61 (95% CI: 1.2-2.1). Results from the qualitative study revealed the positive perspectives on the feasibility to establish a school-based vision care program despite having some limitations. The findings from the RCT showed that the RMS provision was found a cheaper option compared to the CS provision while being equally effective in improving visual acuity to be used in schoolchildren with low to moderate degree myopia. Within our sample of study

participants, RE was detected as a public health problem among school children, and high screen time exposure was found as a risk factor for RE. Also, limiting screen time among school children was a crucial action to be addressed, promotion of eye health care among school children should be performed, and, accordingly, conveys the health education message to limit or reduce screen time. A school-based vision care program can be established. Furthermore, the RMS provision was found as a cost-effective with similar visually improved option to be used in the school-based vision care program compared to the CS among schoolchildren with low to moderate degree myopia.