Review of: "Parents' mHealth App for promoting early dyslexia biomarker detection in children at home or kindergarten: Feasibility, Acceptability, Economic impact and Pilot Study and Survey Results"

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Potential competing interests: No potential competing interests to declare.

This is a study which proposed a novel mobile app that "has an embedded dyslexia biomarker based on Z-scored QEEG data that has accomplished a high accuracy rate in diagnosing dyslexia". The study collected data from 207 children (96 of them have dyslexia, 111 of them are typically developing) between 7-10 years old for 60 sessions, consisting of the eyes-open resting state 2-minute QEEG data from 14-channels. The app, called Auto Train Brain, has dyslexia biomarker detection software embedded into it. The study is conducted to assess the mobile app's dyslexia biomarker detection module's feasibility, acceptability, and economic impact.

The diagnosis of developmental dyslexia is a hot topic worldwide, where the difficulty of advancing its diagnosis to gain more time for intervention to improve children's reading performance outcomes is recognized. The topic of this study is well chosen and meets the needs of society.

It has to be admitted that this is an encouraging invention in terms of advancing EEG for the treatment of developmental disorders, if the effect is promising. Though it still seems to be confusing that how the participants change their brain waves into the correct way.

But still, there are a number of concerns with this study which include the following:

1. As the study mentions, the main application of this invention is to bring the diagnosis of dyslexia forward to pre-school age (3 to 7 years old), but the participants included in the study (and in the related study before) is 6-11 years old. Perhaps this is limited by the current diagnostic conditions for dyslexia, but it also raises the question of whether the app can be used to assist in the diagnosis of preschool dyslexia, which is still needs to be proven, given that children's brain is developing and changing constantly.

2. Whether the simplified EEG headset (14 channels) used in this study can meet the accepted criteria for the diagnosis of dyslexia on EEG needs to be discussed, since current studies worldwide are generally conducted using the equipment of 32-channels or even more, and the clinical trial conducted before is not very convinced either.

3. As mentioned in the study, the "Auto Train Brain has collected norm data from 1700 healthy persons ranging in age from 4 to 80", while the application in this study is specially for children aged from 7-11, and the goal of this invention is for children aged from 3-7. It is doubt that if the standard QEEG values of "normal persons" used in this application is suitable for school age children. Perhaps the data base developed for every age group is needed.

4. Since the aim of this study is to assess the mobile app's dyslexia biomarker detection module's feasibility, acceptability, and economic impact, it is depressing to discover there hasn't been a chart to present the specific result of the survey.

While the paper missed the chart presenting participants' previous reading performance either, the result of “99% of the respondents found the results of the diagnosis correspond to that of the psychiatrists” is a doubt. Moreover, it will be better if the study can show more result of the comparisons of participants' reading performance before and after treatment with the device (especially with the results of widely accepted dyslexia diagnostic scales).