

Fine and Gross Motor Skills Assessment in Pediatrics, from a Caregiver's Perspective, using a Modified Ages and Stages Questionnaire-3

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Introduction

- Research shows that children with sensorineural hearing loss (SNHL) are at greater risk for vestibular deficits compared to normal hearing children, specifically in the areas of fine and gross motor skills. Janky et al. found a referral for vestibular evaluation should be considered for children whose hearing loss is greater than a PTA of 66 dB, those who sit later than 7.25 months or walk later than 14.5 months, or whose parents report concerns for gross motor development. In another study by Kegel et al., it was determined that the etiology of the hearing loss is an important characteristic with an influence on the balance performance. These studies show an important correlation between hearing loss and balance disorders in the pediatric population.
- The Ages and Stages Questionnaire (ASQ-3) is a screening tool that assesses the developmental status of young children in areas such as problem solving, communication, personal-social skills, and gross and fine motor skills.
- The ASQ-3 has been suggested for use for children who are deaf/hard of hearing to screen for additional disabilities (Wiley et al.). Further, it is an efficient screening tool that can be quickly administered by early interventionists, caregivers, school personnel, or other healthcare workers regardless of professional degree.
- The purpose of this study is to determine if there are significant differences in ASQ-3 scores between normal hearing and children with hearing loss aged 6-36 months.
- This study is a continuation of a 2020 prospective study to increase confidence in the results from the previous study, additional data was collected on children with SNHL using the ASQ-3.

Methods

- Data was gathered using the fine (F) and gross (G) motor sections of the ASQ-3 as reported by parents/caregivers of 61 children ages 6-36 months. An a priori power analysis was completed using G-Power 3.1.9.7. indicated that a total sample size of 41 provides at least 0.80 power (0.8167878 actual power) for a large effect size (0.8) and 0.05 p-value.
- Subjects were divided into the two following groups:
 - Group 1** N = 28 normal hearing children
 - Group 2** N = 33 children with SNHL
- Participants were recruited from the UTHSC Audiology and Speech Pathology Clinics.
- Statistical Analysis
 - Independent sample T-Test
 - Independent Variable
 - Group (2 levels – Normal Hearing & Hearing Loss)
 - Dependent Variable
 - ASQ Score (2 levels – ASQ G & ASQ F)
 - Pearson Chi-Square (Crosstabs) for Pass Rates Per Group (ASQ G & ASQ F)

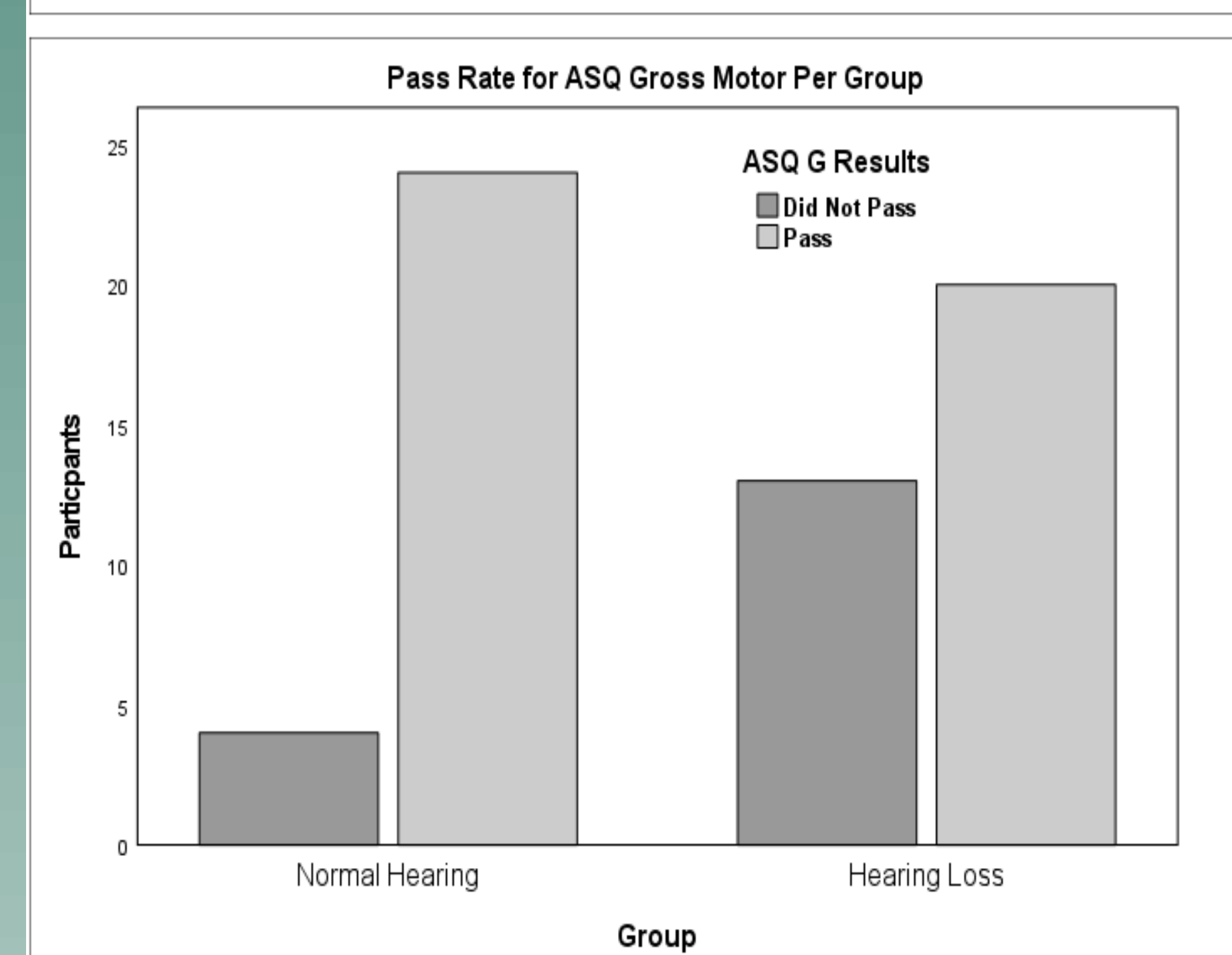
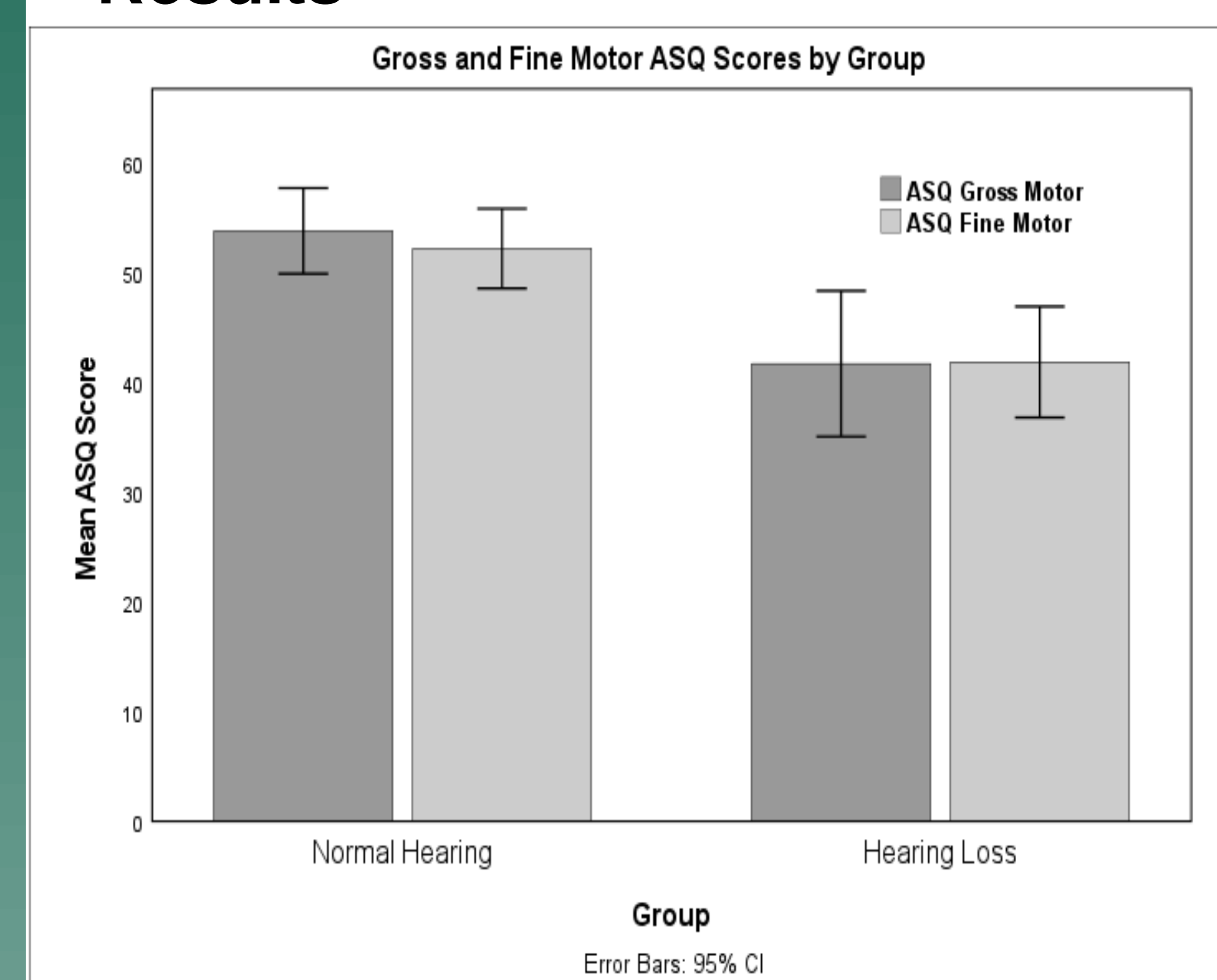
Results

- Results from the Independent sample T-Test indicated a statistically significant difference between the ASQ G and the ASQ F scores with a lower score for the deaf/hard of hearing group for each test.

Group Statistics				
		N	Mean	Std. Deviation
ASQ G	Normal Hearing	28	53.75	10.058
	Hearing Loss	33	41.67	18.694
ASQ F	Normal Hearing	28	52.14	9.372
	Hearing Loss	33	41.82	14.242

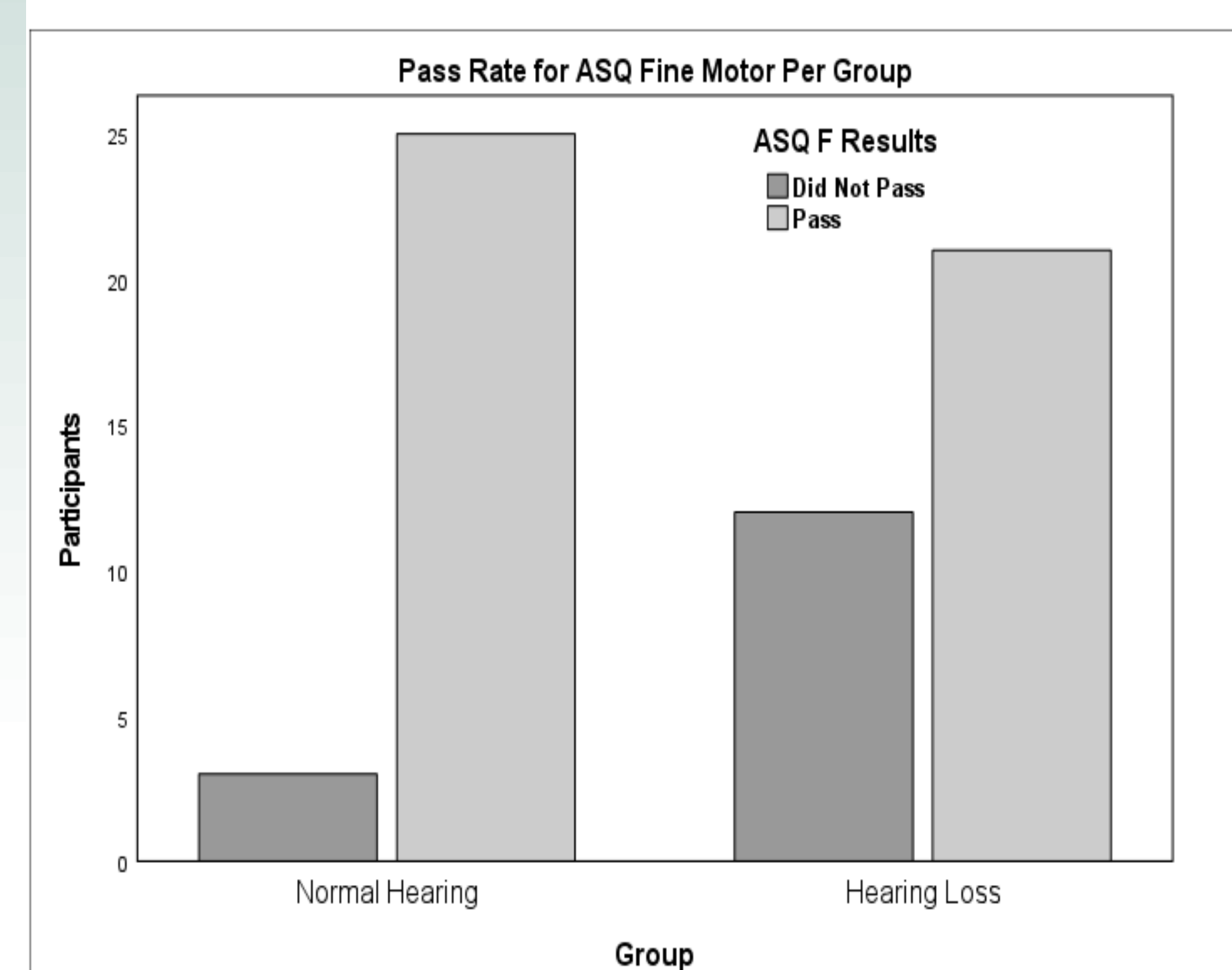
Independent Samples T-Test			
	t	df	Sig. (2-tailed)
ASQ G	3.062	59	.003
ASQ F	3.389	55.778	.001

Results



- Results for the Pearson Chi-Square (Crosstabs) for Pass Rates Per Group (ASQ G & ASQ F) indicated a significant difference in pass rates per group for each test with a lower pass rate for children with hearing loss.

Pearson Chi-Square Tests	Value	df	Significance (2-sided)
ASQ G	4.750	1	.029
ASQ F	5.374	1	.020



Discussion/Conclusion

- The results of this study indicated reduced fine and gross motor skills in children with hearing loss as compared to normal hearing children as well as a lower pass rate on the modified ASQ-3. It has also been found that motor milestones and degree of hearing loss are strong predictors of vestibular loss in children with SNHL (Janky et al.).
- Based on these results and the Wiley et al. study, the ASQ-3 can be used as a tool to help identify children with SNHL and associated motor delays.
- ASQ-3 scores in addition to motor milestones, etiology of the hearing loss, and the degree of hearing loss (Janky et al., Kegel et al.) provide several tools for monitoring motor development in this population and evaluating the need for vestibular evaluation, decreasing the impact of further developmental issues.

Acknowledgments

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References

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