**Title:** Social Communication, Satisfaction, and Loneliness in *FMR1* Premutation Carriers: Relationships and Sex-Based Implications

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**Background**

Studies have shown that individuals with the *FMR1* premutation experience social communication difficulties that may increase their vulnerability to loneliness (Klusek et al., 2021). Social isolation and loneliness, particularly when it persists, can impact mental health outcomes (Mann et al., 2022). Understanding these dynamics among individuals with the *FMR1* premutation is essential, as it may offer insights into the broader emotional and psychological needs of these individuals. This study aims to shed light on (1) the extent to which males and females with the *FMR1* premutation differ from controls in loneliness, social satisfaction and social communication, and (2) the interplay between social communication differences, social satisfaction, and loneliness.

**Methods**

Participants included 34 females with the *FMR1* premutation, 21 female controls, 11 males with the *FMR1* premutation, and 17 male controls. We anticipate having approximately 20 males with the premutation at the time of the conference. Participants completed a virtual testing battery for 1-2 hours, including time for questionnaires. Social communication was characterized using a self-report measure (La Trobe Communication Questionnaire (Douglas et al., 2000; Struchen et al., 2008)) and direct assessment (Pragmatic Rating Scale (Landa et al., 1992)). Higher scores are indicative of greater difficulty with social communication. Loneliness was measured via the self-report UCLA Loneliness Scale-3 (Russell, 1996) and social satisfaction was measured via self-report on the Neuro-QoL (Cella et al., 2012). Group differences in social communication, social satisfaction, and loneliness were evaluated with one-way ANOVAs. Pearson correlations were used to examine links between these domains.

**Results**

Significant group differences were observed in social satisfaction *F*(3, 81)=4.07, *p*=.010 and a marginal difference was observed in self-reported social communication *F*(3,81)=2.57, *p*=.060. Follow-up *t*-tests showed that females with the *FMR1* premutation showed significantly lower social satisfaction than males with the premutation (*p*=.009), male controls (*p*=.005), and marginally lower than female controls (*p*=.053). No differences were observed in self-reported loneliness or direct assessment social communication (*p*-values> .496). For females with the premutation and female controls, greater self-reported social communication difficulties were associated with lower social satisfaction (*r* = -.73, *p*<.001; *r* = -.47, *p*=.020, respectively) and greater loneliness (*r* = .60, *p*<.001; *r*=.46, *p*=.026, respectively). However, no associations were observed in these domains for males in either group.

**Conclusions**

The study revealed significant differences in social satisfaction among female *FMR1* premutation carriers, who experienced notably lower satisfaction compared to males and controls. Although loneliness levels did not differ significantly, females with the premutation showed a strong association between social communication difficulties and reduced social satisfaction, suggesting that their social quality of life is closely tied to self-perceived communication abilities. These findings highlight the need for sex-specific clinical supports focused on social satisfaction and interactions, which could help mitigate social dissatisfaction and enhance overall well-being.

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