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Knowledge and attitudes toward people who stutter among health sciences students: a cross-sectional study

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Abstract

Background The social model of disability acknowledges that the difficulties faced by persons who stutter (PWS) stem not only from speech dysfluency but also from societal barriers, misconceptions, and stigmatizing attitudes that limit participation and inclusion. As future healthcare professionals, health sciences students play an important role in promoting early detection, proper referral, and supportive care. However, there is limited research about their knowledge, beliefs, and attitudes around stuttering, particularly in Palestine and underserved areas.

Methods A cross-sectional study was carried out on 603 students enrolled in 14 health-related fields at An-Najah National University in Palestine. Participants completed an online questionnaire that assessed their knowledge and attitudes toward stuttering. SPSS version 25 was used to conduct descriptive statistics and chi-square tests to investigate the relationships between responses and gender, residence, and academic discipline.

Results Significant misconceptions persisted even though the majority of participants acknowledged the significance of early identification (87.9%) and disputed the idea that stutterers are less intelligent (83.3%). Less than half (38.1%) were aware of nearby treatment facilities, and only 22.9% recognized stuttering as a genetic problem. Many participants thought stutterers were quiet or shy (69.5%), more susceptible to mental health issues (73.6%), and socially ignored (46.1%). Gender, place of residence, and academic discipline all showed significant disparities. While students from a number of other disciplines showed more doubt and misconceptions, students in audiology and speech consistently showed the highest levels of knowledge and more evidence-informed attitudes.

Conclusion This study reveals considerable knowledge gaps and persistent stigmatizing attitudes toward people who stutter among health sciences students, with marked disparities across disciplines. Targeted curricular interventions are warranted to address misconceptions about people who stutter.

Keywords Stuttering, Knowledge and attitude, Health sciences students, Misconceptions, Stigmatizing

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Introduction

Stuttering is a complex communication condition characterized by repetitions, prolongations, and abnormal stoppages of sounds and syllables that disrupt speech fluency. Knowledge and attitudes toward people who stutter (PWS) are shaped by cultural, educational, and social perspectives [1–3]. Several worldwide studies have shown that nonstuttering adults have a negative attitude toward those who stutter (PWS) [4–7]. PWS are often perceived as shy, withdrawn, nervous, or less capable [8]. Additionally, stigmatized attitudes can result in poor academic performance, a lower quality of life, low self-esteem, unemployment or underemployment, and unfavorable social responses like bullying, teasing, rejection, and social harm [8, 9]. In terms of employment opportunities, non-stutterers are more likely than PWS to have jobs requiring effective communication [10]. Society's perception of communication problems, particularly stuttering, greatly influences beliefs about PWS, as numerous studies have demonstrated. Gender, age, education, and culture also influence the opinions of non-stutterers about PWS [9, 11].

Public awareness is critical to reducing stigma, challenging negative perceptions, and fostering a more supportive social environment. Misconceptions, such as associating stuttering with low intelligence or psychological frailty, can lead to discrimination and social isolation. As a result, increasing knowledge is critical for developing more accurate and compassionate perceptions of PWS. Additionally, such knowledge can lessen people's negative perceptions of that disability [18]. For parents, particularly those of young children, awareness of stuttering is critical to enable early identification and timely intervention, which are associated with better therapeutic outcomes [10]. Studies showed that parents' understanding of stuttering directly influences help-seeking behaviour, access to services, and adherence to treatment recommendations, while lack of awareness may delay intervention and negatively affect long-term outcomes [12].

Despite research on general public attitudes [7, 13–17], there is limited information about the knowledge and attitudes of medical and health sciences students. As future professionals who may encounter PWS, their perspectives are essential for informing curricula, promoting accurate understanding of stuttering, and reducing negative beliefs. Better awareness among health professionals can improve treatment access and support early identification and intervention. Thus, a better understanding of stuttering should lead to more favourable perceptions of PWS. Research on other disabilities suggests that increased public awareness of stuttering could lead to improved treatment for PWS. Public awareness of stuttering and other disabilities is necessary; however,

enhancing health professionals' knowledge base throughout university training is especially important in developing proper perceptions and attitudes. Because the general public frequently relies on the advice of health professionals, their informed perspectives can be critical in dispelling myths, cultivating supportive attitudes toward PWS, and encouraging parents to seek medical consultation and early intervention for suspected cases. Furthermore, the social model of disability, which emerged from the disability rights movement, sees disability as the outcome of mismatches between a person's functioning and a society intended for normative bodies and fluent speakers, rather than an intrinsic defect in the individual. This viewpoint considers stuttering as a hindering social phenomenon rather than a result of the problem itself. Stutterers face negative stereotypes and discriminatory attitudes, as well as environmental problems like time-pressed communication settings and voice-automated systems that fail to identify dysfluent speech [18, 19].

Therefore, this study evaluates the knowledge and attitudes of medical and health sciences students toward PWS through an online survey, aiming to identify gaps and inform educational strategies that promote recognition, early intervention, and supportive care.

Methods

Study design, setting, and participants

This observational cross-sectional study was conducted at the Faculty of Medicine and Health Sciences at An-Najah National University in Nablus, Palestine, which has an approximate enrollment of 8,500 students across various academic disciplines, with a mean age of 20 ± 1.3 years. The minimum required sample size was calculated using the single proportion formula: $n = Z (\alpha/2)^2 \times p \times q / d^2$, assuming a sample proportion of 50%, a 95% confidence interval, and a 5% margin of error, which yielded a minimum of 384 participants. Data were collected between January and March 2023, during which 603 participants completed the survey, exceeding the calculated minimum and thereby strengthening the representativeness of the sample.

Participants were recruited using a convenience sampling technique. An online questionnaire was distributed electronically through multiple channels, including institutional email and popular social media platforms and applications such as Facebook and WhatsApp, targeting relevant student groups within the faculty. The questionnaire was hosted on Google Forms, through which participants received a direct web link granting them easy and immediate access to the survey. Upon completing their responses, participants submitted the form electronically, and their answers were automatically and securely transmitted to the research team in real time.

Ethical consideration

The study was approved by the Institutional Review Board (IRB) of An-Najah University in Nablus, Palestine (H.sp. 2023/8), and was performed in compliance with the Helsinki Declaration for research on humans. Prior to their inclusion in the study, all participants were required to provide informed consent by clicking the agreement button at the beginning of the online questionnaire. Those who did not click to agree to the consent form were automatically excluded from participation and were unable to proceed to the survey. The consent form clearly outlined the study's objectives and guaranteed that participation was both anonymous and voluntary, with no penalties imposed for choosing not to participate.

Data collection instrument

The data collection instrument was an online questionnaire designed to assess participants' knowledge and attitudes toward people who stutter (PWS). The questionnaire consisted of 16 questions covering various aspects of stuttering, including its causes, characteristics, and societal attitudes. The questions were adopted from previous literature [3, 20, 21]. The questions included eight knowledge-based items that addressed the following topics: whether stuttering is a genetic disorder; the possibility of a cure; the importance of early diagnosis; the usefulness of speech correction after each stuttering episode; difficulty saying one's own name; whether stuttering occurs on every word; the speech rate of people who stutter; and which gender is more likely to stutter. In addition, the questions involved six attitude-based questions, including perceived intelligence of people who stutter, the impact of stuttering on academic achievement, personality traits associated with stuttering, vulnerability to mental health disorders, the effect of harassment on stuttering severity, and social neglect of people who stutter. Two questions were included to evaluate the participants' personal experience with meeting someone who stutters and the availability of stuttering treatment centers. Besides these core questions, participants were asked to provide basic demographic information, including their academic discipline and gender.

The questionnaire was targeted specifically at students enrolled in 14 health-related disciplines at the Faculty of Medicine and Health Sciences at An-Najah National University, namely, Anesthesia and Resuscitation, Audiology and Speech, Cardiac Perfusion, Cosmetics and Skin Care, Dentistry, Doctor of Pharmacy, Human Medicine, Medical Imaging, Medical Laboratory, Midwifery, Nursing, Optometry, Pharmacy, and Physiotherapy.

The questionnaire was originally developed in English and subsequently translated into Arabic by a qualified professional translator, given that Arabic is the mother tongue of the study population. To ensure linguistic

accuracy and conceptual equivalence, the Arabic version was then back-translated into English by independent language experts. Prior to data collection, the questionnaire was reviewed by experts in public health and speech-language disorders to establish content validity. A pilot study was then conducted with 30 participants to assess item clarity, relevance, and feasibility. As no major modifications were required following the pilot, these participants were retained and included in the final analysis. Given that the questionnaire consisted primarily of categorical and independent variables rather than items measuring a single underlying construct, the reliability of the instrument was sufficiently supported through expert validation and pilot testing.

Data analysis

All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS, version 25.0). Descriptive statistics were conducted first, with categorical variables expressed as frequencies and percentages. To examine associations between categorical variables across demographic groups, including gender, residential area, and academic discipline, the chi-square test was applied. Statistical significance was set at a p-value of less than 0.05 for all analyses. Given the exploratory nature of the study and the number of statistical comparisons performed, no formal adjustment for multiple testing was applied. Therefore, statistically significant findings should be interpreted cautiously.

Results

Demographic characteristics of the participants

The current study aims to provide information on the level of stuttering awareness among medical and health students at the Faculty of Medicine and Health Sciences. The chi-square test is used to compare individuals based on gender, address, and academic discipline. 603 students were invited to participate in this questionnaire-based study. The study population was distributed based on their living address, with 48.5%, 3%, and 48.5% living in cities, refugee camps, and villages, respectively. The majority of participant addresses were evenly spread between cities and villages, with a minority coming from refugee camps. The study population was distributed by gender, with 81% female respondents and 19% males. Figure 1 depicts the distribution of the population according to their academic discipline.

Participant's responses to the questions

Table 1 presents a summary of responses about perspectives of stuttering, demonstrating diverse beliefs regarding its essence and influence. 83.3% of the respondents disagreed with the idea that stuttering is a sign of lower

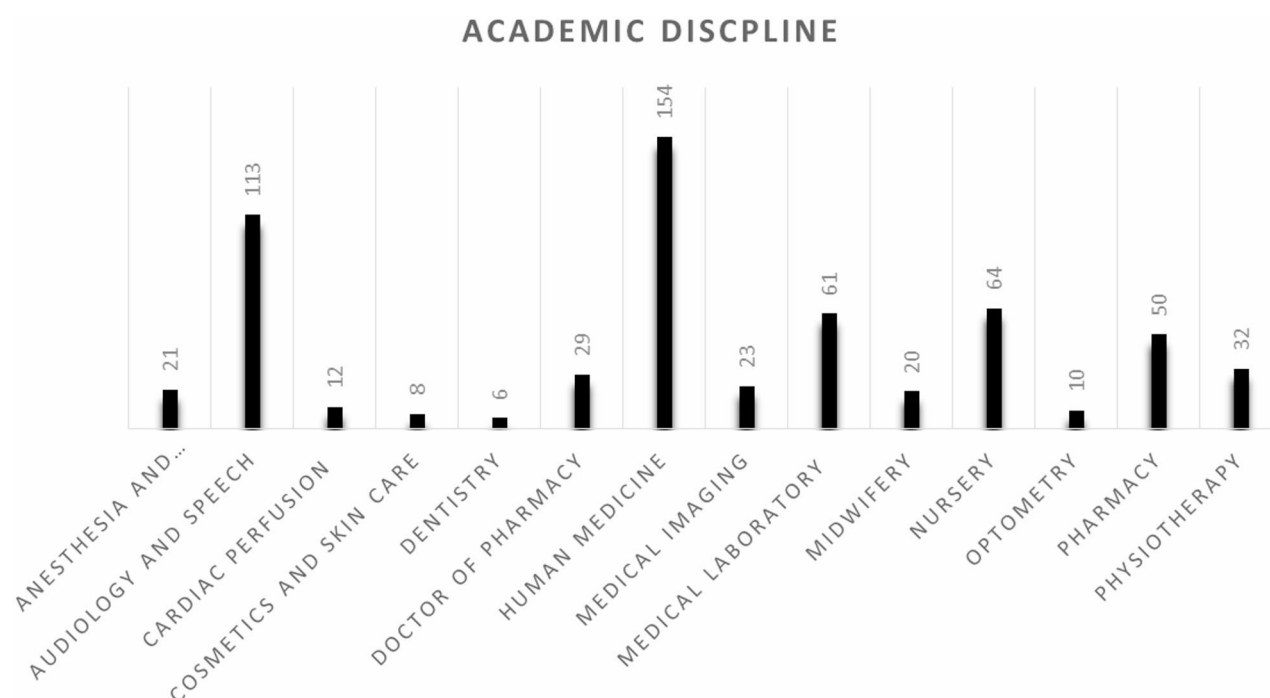


Fig. 1 The distribution of the study population according to their academic discipline

Table 1 Descriptive statistics of the responses for each question, percentage (frequency), $n=603$

Question/item	Do Not Know	Maybe (not sure)	No	Yes
1. In your opinion, do you think that stuttering is a genetic disorder?	2.8% (17)	35.5% (214)	38.8% (234)	22.9% (138)
2. Is there a stuttering treatment center in your area?	8.6% (52)	10.9% (66)	42.3% (255)	38.1% (230)
3. In your opinion, are stutterers less intelligent than non-stutterers?	4.6% (28)	7.6% (46)	83.3% (502)	4.5% (27)
4. In your opinion, do you think that stuttering affects the academic achievement of the stuttering person?	1.2% (7)	24.4% (147)	35.0% (211)	39.5% (238)
5. In your opinion, are stuttering people mostly quiet and shy?	1.8% (11)	16.1% (97)	12.6% (76)	69.5% (419)
6. In your opinion, is a person who stutters more vulnerable to mental disorders than others?	1.7% (10)	19.6% (118)	5.1% (31)	73.6% (444)
7. In your opinion, does the severity of stuttering increase when the stuttering person is harassed by his colleagues?	2.0% (12)	10.4% (63)	4.1% (25)	83.4% (503)
8. In your opinion, do you think that the majority of people who stutter are ignored by society?	4.0% (24)	26.9% (162)	23.1% (139)	46.1% (278)
9. In your opinion, is there a cure for stuttering?	3.2% (19)	19.7% (119)	8.0% (48)	69.2% (417)
10. In your opinion, do you think that diagnosing stuttering at an early age contribute greatly to controlling it?	2.0% (12)	8.0% (48)	2.2% (13)	87.9% (530)
11. In your opinion, is correcting the stuttering person's speech after each stutter useful?	3.8% (23)	17.2% (104)	55.2% (333)	23.7% (143)
12. In your opinion, do people who stutter have difficulty saying their names?	4.0% (24)	29.4% (177)	26.2% (158)	40.5% (244)
13. In your opinion, does the stuttering person stutter in all his words?	3.3% (20)	17.7% (107)	65.2% (393)	13.8% (83)
14. In your opinion, do stutterers usually speak quickly?	3.5% (21)	21.6% (130)	35.3% (213)	39.6% (239)
15. Have you met a stuttering person? No/Yes	16.9% (102)	– (0)	15.1% (91)	68.0% (410)
16. In your opinion, who are the people most likely to stutter, F/M?	40.1% (242)	– (0)	15.8% (95)	44.1% (266)

*Bolded questions are knowledge-based domains, and non-bolded questions are attitude-based domains

intelligence. However, a substantial number of them (39.5%) considered that stuttering does have an impact on academic performance. Furthermore, a majority of the respondents, 73.6%, believed that stuttering increases the likelihood of experiencing mental problems. The majority of participants (69.5%) perceived stutterers as being introverted and reserved, while a significant portion (46.1%) believed that they are overlooked or disregarded by society. Furthermore, a significant majority (83.4%) agreed that harassment exacerbates stuttering, but there was a divergence of viewpoints regarding the effectiveness of speech correction. Opinions on causes are divided, with only 22.9% attributing stuttering to genetics, while 35.5% remain unsure. Notably, 87.9% emphasize the importance of early diagnosis, and 69.2% believe in a cure, though fewer (38.1%) report local treatment centers, revealing a gap between perception and resource availability.

The effect of demographics on participants' knowledge and attitudes concerning PWS

Table 2: Presents the association between participants' socio-demographic characteristics (residence and gender) and their responses to the study questions. The data are reported as frequencies (n) and percentages (%). The percentages shown in this table were calculated within each category of the socio-demographic variable rather than from the total study population. Results reveal statistically significant associations ($p < 0.05$) between participants' residence and their responses to questions 2, 9, and 16. For Q2 (availability of a stuttering treatment centre), city residents reported the highest proportion of "Yes" responses (54.6%), whereas village residents most frequently responded "No" (63.7%) ($p = 0.000$). For Q9 (existence of a cure for stuttering), city and village residents were more likely to support the existence of a cure (70.0%, 69.2%), respectively) compared to refugee camp (55.6%) residents ($p = 0.033$). For Q16 (gender most likely to stutter), a higher percentage of city residents believed males are more likely to stutter (48.8%), followed by villagers (39.7%) and refugee camp residents (38.9%) ($p = 0.047$). No other statistically significant associations were observed between residence and the remaining items ($p > 0.05$).

Significant differences were observed for questions 3, 7, 10, 11, 13, and 15 concerning the gender of the respondent. In Q3 (intelligence), females were more likely to disagree that stutterers are less intelligent (85.3%) compared to males (74.3%), whereas males were more inclined to agree (11.5% vs. 2.9%) ($p = 0.001$). Additionally, more females than males agreed that harassment worsens stuttering severity (84.5% vs. 78.8%; $p = 0.001$) and that early diagnosis is favourable for controlling stuttering (89.2% vs. 82.3%; $p = 0.005$). Conversely, males were more likely

than females to agree that correcting speech after each stutter is useful (33.6% vs. 21.4%; $p = 0.005$), and a higher proportion of males agreed that stuttering occurs on all words (25.7% vs. 11.0%; $p = 0.000$). Moreover, more males had personally met a stutterer (78.8%) compared to females (65.5%) ($p = 0.020$). Most other questions yielded no significant sex differences, though question 4 (stuttering affecting academic achievement) approached significance ($p = 0.059$).

Effects of academic discipline on participants' attitudes and knowledge concerning PWS

Supplementary Table (see supplementary material) represents the association between participants' discipline and their responses to the study questions. The data are reported as frequencies (n) and percentages (%). The percentages shown in this table were calculated within each discipline rather than from the total study population. Results indicate statistically significant relationships ($p < 0.05$) between academic discipline and responses for the majority of questionnaire items. The most consistently significant differences were found for Q1 (genetic disorder, $p = 0.023$), Q3 (intelligence, $p = 0.010$), Q4 (academic achievement, $p = 0.001$), Q7 (harassment and severity, $p = 0.014$), Q8 (ignored by society, $p = 0.000$), Q9 (cure, $p = 0.000$), Q10 (early diagnosis, $p = 0.022$), Q11 (correcting speech, $p = 0.018$), Q12 (difficulty saying name, $p = 0.002$), Q13 (stuttering on all words, $p = 0.010$), Q14 (speaking quickly, $p = 0.000$), and Q16 (gender most affected, $p = 0.000$). In contrast, Q2 (presence of a treatment centre, $p = 0.081$), Q5 (stutterers are quiet/shy, $p = 0.194$), Q6 (vulnerability to mental disorders, $p = 0.813$), and Q15 (having met a stutterer, $p = 0.057$) did not reach statistical significance.

Participants in Audiology and Speech consistently demonstrated the highest levels of accurate knowledge across multiple items. In Q3 (intelligence), Audiology and Speech students provided the highest percentage of correct "No" responses (96.5%), followed by Human Medicine (86.4%). On Q11 (correcting speech after each stutter is useful), audiology and speech students had the highest percentage of correct "No" responses (71.7%), followed by human medicine (59.7%). Furthermore, on Q13 (stuttering on all words), Audiology and Speech students provided the most correct "No" responses (78.8%). For Q10 (early diagnosis helps manage stuttering), Audiology and Speech (94.7%) and Human Medicine (87.7%) received the highest proportions of "Yes" replies. On Q7 (harassment increases severity), Audiology and Speech recorded 92.9% "Yes" responses, while Human Medicine recorded 87.7%.

In contrast, students in Anesthesia and Resuscitation, Cardiac Perfusion, Cosmetics and Skin Care, and Dentistry frequently demonstrated poorer awareness

Table 2 Distribution of responses to questionnaire items according to socio-demographic characteristics (frequency and percentage within each category) (total $N=603$)

1. In your opinion, do you think that stuttering is a genetic disorder?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	5 (1.7%)	100 (34.1%)	116 (39.6%)	72 (24.6%)	0.256
Refugee camp	0 (0.0%)	10 (55.6%)	4 (22.2%)	4 (22.2%)	
Village	12 (4.1%)	104 (35.6%)	114 (39.0%)	62 (21.2%)	
Gender					0.443
Female	14 (2.9%)	181 (36.9%)	184 (37.6%)	111 (22.7%)	
Male	3 (2.7%)	33 (29.2%)	50 (44.2%)	27 (23.9%)	
2. Is there a stuttering treatment center in your area?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	40 (13.7%)	34 (11.6%)	59 (20.1%)	160 (54.6%)	0
Refugee camp	1 (5.6%)	3 (16.7%)	10 (55.6%)	4 (22.2%)	
Village	11 (3.8%)	29 (9.9%)	186 (63.7%)	66 (22.6%)	
Gender					0.327
Female	45 (9.2%)	57 (11.6%)	200 (40.8%)	188 (38.4%)	
Male	7 (6.2%)	9 (8.0%)	55 (48.7%)	42 (37.2%)	
3. In your opinion, are stutterers less intelligent than non-stutterers?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	16 (5.5%)	19 (6.5%)	243 (82.9%)	15 (5.1%)	0.328
Refugee camp	1 (5.6%)	3 (16.7%)	12 (66.7%)	2 (11.1%)	
Village	11 (3.8%)	24 (8.2%)	247 (84.6%)	10 (3.4%)	
Gender					0.001
Female	21 (4.3%)	37 (7.6%)	418 (85.3%)	14 (2.9%)	
Male	7 (6.2%)	9 (8.0%)	84 (74.3%)	13 (11.5%)	
4. In your opinion, do you think that stuttering affects the academic achievement of the stuttering person?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	3 (1.0%)	65 (22.2%)	99 (33.8%)	126 (43.0%)	0.287
Refugee camp	1 (5.6%)	3 (16.7%)	6 (33.3%)	8 (44.4%)	
Village	3 (1.0%)	79 (27.1%)	106 (36.3%)	104 (35.6%)	
Gender					0.059
Female	3 (0.6%)	122 (24.9%)	174 (35.5%)	191 (39.0%)	
Male	4 (3.5%)	25 (22.1%)	37 (32.7%)	47 (41.6%)	
5. In your opinion, are stuttering people mostly quiet and shy?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	6 (2.0%)	36 (12.3%)	37 (12.6%)	214 (73.0%)	0.146
Refugee camp	1 (5.6%)	5 (27.8%)	1 (5.6%)	11 (61.1%)	
Village	4 (1.4%)	56 (19.2%)	38 (13.0%)	194 (66.4%)	
Gender					0.343
Female	10 (2.0%)	84 (17.1%)	59 (12.0%)	337 (68.8%)	
Male	1 (0.9%)	13 (11.5%)	17 (15.0%)	82 (72.6%)	
6. In your opinion, is a person who stutters more vulnerable to mental disorders than others?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	3 (1.0%)	51 (17.4%)	19 (6.5%)	220 (75.1%)	0.369
Refugee camp	1 (5.6%)	3 (16.7%)	1 (5.6%)	13 (72.2%)	
Village	6 (2.1%)	64 (21.9%)	11 (3.8%)	211 (72.3%)	
Gender					0.177
Female	6 (1.2%)	100 (20.4%)	23 (4.7%)	361 (73.7%)	
Male	4 (3.5%)	18 (15.9%)	8 (7.1%)	83 (73.5%)	
7. In your opinion, does the severity of stuttering increase when the stuttering person is harassed by his colleagues?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	5 (1.7%)	29 (9.9%)	13 (4.4%)	246 (84.0%)	0.819
Refugee camp	1 (5.6%)	3 (16.7%)	0 (0.0%)	14 (77.8%)	
Village	6 (2.1%)	31 (10.6%)	12 (4.1%)	243 (83.2%)	

Table 2 (continued)

7. In your opinion, does the severity of stuttering increase when the stuttering person is harassed by his colleagues?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
Gender					
Female	7 (1.4%)	55 (11.2%)	14 (2.9%)	414 (84.5%)	0.001
Male	5 (4.4%)	8 (7.1%)	11 (9.7%)	89 (78.8%)	
8. In your opinion, do you think that the majority of people who stutter are ignored by society?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	13 (4.4%)	79 (27.0%)	67 (22.9%)	134 (45.7%)	0.702
Refugee camp	1 (5.6%)	8 (44.4%)	3 (16.7%)	6 (33.3%)	
Village	10 (3.4%)	75 (25.7%)	69 (23.6%)	138 (47.3%)	
Gender					
Female	19 (3.9%)	135 (27.6%)	113 (23.1%)	223 (45.5%)	0.867
Male	5 (4.4%)	27 (23.9%)	26 (23.0%)	55 (48.7%)	
9. In your opinion, is there a cure for stuttering?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	9 (3.1%)	55 (18.8%)	24 (8.2%)	205 (70.0%)	0.033
Refugee camp	3 (16.7%)	5 (27.8%)	0 (0.0%)	10 (55.6%)	
Village	7 (2.4%)	59 (20.2%)	24 (8.2%)	202 (69.2%)	
Gender					
Female	13 (2.7%)	99 (20.2%)	37 (7.6%)	341 (69.6%)	0.396
Male	6 (5.3%)	20 (17.7%)	11 (9.7%)	76 (67.3%)	
10. In your opinion, do you think that diagnosing stuttering at an early age contribute greatly to controlling it?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	9 (3.1%)	28 (9.6%)	9 (3.1%)	247 (84.3%)	0.87
Refugee camp	1 (5.6%)	2 (11.1%)	0 (0.0%)	15 (83.3%)	
Village	2 (0.7%)	18 (6.2%)	4 (1.4%)	268 (91.8%)	
Gender					
Female	8 (1.6%)	39 (8.0%)	6 (1.2%)	437 (89.2%)	0.005
Male	4 (3.5%)	9 (8.0%)	7 (6.2%)	93 (82.3%)	
11. In your opinion, is correcting the stuttering person's speech after each stutter useful?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	11 (3.8%)	50 (17.1%)	167 (57.0%)	65 (22.2%)	0.814
Refugee camp	0 (0.0%)	5 (27.8%)	9 (50.0%)	4 (22.2%)	
Village	12 (4.1%)	49 (16.8%)	157 (53.8%)	74 (25.3%)	
Gender					
Female	19 (3.9%)	86 (17.6%)	280 (57.1%)	105 (21.4%)	0.005
Male	4 (3.5%)	18 (15.9%)	53 (46.9%)	38 (33.6%)	
12. In your opinion, do people who stutter have difficulty saying their names?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	8 (2.7%)	88 (30.0%)	77 (26.3%)	120 (41.0%)	0.732
Refugee camp	1 (5.6%)	6 (33.3%)	6 (33.3%)	5 (27.8%)	
Village	15 (5.1%)	83 (28.4%)	75 (25.7%)	119 (40.8%)	
Gender					
Female	19 (3.9%)	147 (30.0%)	127 (25.9%)	197 (40.2%)	0.904
Male	5 (4.4%)	30 (26.5%)	31 (27.4%)	47 (41.6%)	
13. In your opinion, does the stuttering person stutter in all his words?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	8 (2.7%)	44 (15.0%)	195 (66.6%)	46 (15.7%)	0.411
Refugee camp	1 (5.6%)	2 (11.1%)	12 (66.7%)	3 (16.7%)	
Village	11 (3.8%)	61 (20.9%)	186 (63.7%)	34 (11.6%)	
Gender					
Female	15 (3.1%)	92 (18.8%)	329 (67.1%)	54 (11.0%)	0
Male	5 (4.4%)	15 (13.3%)	64 (56.6%)	29 (25.7%)	

Table 2 (continued)

Table 2 (continued)

14. In your opinion, do stutterers usually speak quickly?					
Residence	Do Not Know	Maybe (not sure)	NO	YES	P-Value
City	12 (4.1%)	65 (22.2%)	97 (33.1%)	119 (40.6%)	0.889
Refugee camp	1 (5.6%)	3 (16.7%)	7 (38.9%)	7 (38.9%)	
Village	8 (2.7%)	62 (21.2%)	109 (37.3%)	113 (38.7%)	
Gender					0.154
Female	14 (2.9%)	107 (21.8%)	180 (36.7%)	189 (38.6%)	
Male	7 (6.2%)	23 (20.4%)	33 (29.2%)	50 (44.2%)	

15. Have you met a stuttering person? No/Yes				
Residence	Do Not Know	NO	YES	P-Value
City	47 (16.0%)	52 (17.7%)	194 (66.2%)	0.124
Refugee camp	6 (33.3%)	3 (16.7%)	9 (50.0%)	
Village	49 (16.8%)	36 (12.3%)	207 (70.9%)	
Gender				0.02
Female	91 (18.6%)	78 (15.9%)	321 (65.5%)	
Male	11 (9.7%)	13 (11.5%)	89 (78.8%)	

16. In your opinion, who are the people most likely to stutter, F/M?				
Residence	Do Not Know	NO	YES	P-Value
City	99 (33.8%)	51 (17.4%)	143 (48.8%)	0.047
Refugee camp	8 (44.4%)	3 (16.7%)	7 (38.9%)	
Village	135 (46.2%)	41 (14.0%)	116 (39.7%)	
Gender				0.74
Female	195 (39.8%)	85 (17.3%)	210 (42.9%)	
Male	47 (41.6%)	10 (8.8%)	56 (49.6%)	

or greater uncertainty. For example, in Q1 (genetic disorder), Anesthesia and Resuscitation students recorded 52.4% “Yes” responses compared to 29.2% in Audiology and Speech and 18.8% in Human Medicine. In Q4 (academic achievement impaired), Anesthesia and Resuscitation students recorded 38.1% “Yes” responses compared to 58.4% for Audiology and Speech and 35.7% for Human Medicine. On Q9 (cure for stuttering), anesthesia and resuscitation students gave 47.6% “Yes” responses, whereas human medicine students gave 70.8%, and audiology and speech students gave 62.8%. On Q8 (ignored by society), Anesthesia and Resuscitation recorded 61.9% “Yes” responses, compared to 51.3% for Audiology and Speech and 40.9% for Human Medicine. On Q14 (stutterers speak quickly), Audiology and Speech recorded 67.3% “Yes” responses, while Human Medicine recorded 39.6%, and Anesthesia and Resuscitation recorded 33.3%. On Q16 (gender most likely to stutter), Audiology and Speech recorded 75.2% identifying males as most affected, compared to 42.9% in Anesthesia and Resuscitation and 40.9% in human medicine.

Some disciplines had small sample sizes (e.g., Cosmetics and Skin Care, $n=8$ for most items; Dentistry, $n=6$; Cardiac Perfusion, $n=12$; Optometry, $n=10$), resulting in low absolute frequencies, and these findings should be interpreted with caution. The p -value for Q2 (treatment center awareness) approached but did not reach statistical significance ($p=0.081$). Q15 (having met a stutterer) was likewise non-significant ($p=0.057$).

Discussion

The findings of this study shed light on the awareness and attitudes of medical and health sciences students toward PWS. While a majority demonstrated basic awareness, significant gaps remained regarding stuttering’s causes and social implications, with these perceptions varying notably by gender, geographic location, and academic discipline. These insights emphasize the necessity of targeted, multifaceted educational interventions to address knowledge gaps, correct misconceptions, and ultimately reduce stigma among future healthcare professionals.

The majority of the study participants (83.3%) correctly rejected the stereotype that stutterers are less intelligent, which is consistent with evidence-based understanding of stuttering because many children who stutter have normal cognitive development. A small subset may have developmental delays, but this scenario is not typical [22, 23]. However, misconceptions such as associating stuttering with shyness (69.5%) or linking it to mental health vulnerability (73.6%) persist. These findings support earlier studies showing that PWS are stereotyped as anxious or introverted, increasing stigma and social isolation [8, 10, 24]. Stuttering adults are perceived as more apprehensive, insecure, and cognitively unable than proficient speakers [22, 24]. The persistence of these myths underscores the need for educational campaigns to address these biases, particularly among future healthcare professionals who may encounter PWS in clinical settings. It was reported that stuttering among younger or older

individuals is considered to be a negative experience during social interactions, leading to limited communication [25], and it could happen in all cultures in association with physical components [26].

Female students did better than male students on measures of both knowledge and attitude. Compared to the male participants, the female participants consistently showed a greater degree of knowledge. For instance, among the female participants, 85.3% disagreed with the intelligence stereotype; 84.5% said that harassment makes stuttering worse; and 89.2% said that early diagnosis is a need. There was a gender gap in the likelihood that men would use ineffective techniques, such as correcting speech after each stutter (33.6% of males vs. 21.4% of females). Males are more likely than females to have witnessed someone else stutter in person (89% of males vs. 65.5% of females). On the other hand, men were more likely to attribute genetics to the stuttering problem. Our results could have been impacted by cultural or sampling factors. Findings from this study reveal that gender does influence stuttering knowledge towards PWS, even amongst university-affiliated students. Gender differences in social sensitivity, empathy, and experience with people who have communication impairments may explain these discrepancies. The gender effect on perception is different for men and women, which is consistent with our findings and those of other research. In a Chealian study, differences in perceptions may be influenced by socio-demographic factors such as gender, suggesting the need for educational interventions to promote deeper understanding of the condition [27]. In general, female adolescents had a more positive attitude toward people who stutter, as did students from the highest education level [28].

Geographic location significantly influenced awareness levels in the study. Urban respondents demonstrated higher knowledge of stuttering treatment centers compared to rural and refugee camp resident participants, reflecting disparities in healthcare accessibility and information dissemination. Prior studies have demonstrated that people residing in metropolitan regions typically have easier access to healthcare facilities and health-related information, but those residing in rural areas frequently encounter obstacles such as scarce services, transportation problems, and reduced health literacy [29]. This gap emphasizes the necessity of targeted outreach and educational initiatives in rural and underserved communities, including refugee camps, to ensure equitable access to resources and support for individuals who stutter. Addressing these disparities is crucial for fostering inclusive awareness and reducing stigma across all regions.

Academic discipline also emerged as a significant component. Students studying audiology, speech-language

pathology, and medicine provided the most accurate answers to nearly every question. Consistent with earlier studies, the results indicate that speech-language pathologists and therapists from Jordan had the best attitudes toward stuttering [30]. Respondents in fields with less stuttering exposure, such as anesthesia, dentistry, and perfusion, exhibited significantly greater doubt or misconceptions (frequently responding “do not know”). These discipline gaps highlight the importance of education: individuals who have been trained in stuttering (speech language pathologists, audiologists) comprehend it better than others, who may rely on stereotypes. Our findings revealed clear demographic patterns in knowledge and attitudes.

Understanding the advantages of early intervention in enhancing speech outcomes and lowering psychological consequences, the study also found that 87.9% of participants agreed that early diagnosis is crucial for effective stuttering management. But there is a big difference between this knowledge and common misunderstandings, such as the idea that there is a permanent cure (69.2%), even if there are not many treatment centers (38.1%). The findings of the survey revealed that, while the general population is familiar with stuttering, people lack a detailed understanding of the disorder and its characteristics. Some countries have performed socially oriented research on the disorder to assess the knowledge and information that the local people have regarding stuttering [28, 31–33].

Interpreting the current findings through the lenses of the social model of disability and stigma theory reveals that the misconceptions identified in this study are not only unnoticeable information gaps, but active contributors to the social marginalization of people who stutter. When future healthcare professionals—who will occupy positions of authority and influence in clinical and community settings—hold beliefs that people who stutter are introverted, socially ignored, and vulnerable to mental health problems, these attitudes risk being translated into discriminatory practices, reduced expectations, and diminished quality of care [19, 34]. The misconception that stuttering increases vulnerability to mental disorders (73.6%) and that people who stutter are socially overlooked (46.1%) show how deficit-based assumptions can shape expectations about social participation and psychological functioning, potentially leading clinicians to underestimate stutterers or attribute unrelated speech difficulties to them. Given that controllable attributions for stuttering are associated with greater blame, anger, and social distance, the finding that 35.5% of students were uncertain about the genetic basis of stuttering while others attributed it to psychological or behavioral causes is concerning [35]. These patterns demonstrate how the medical model's concentration on individual pathology

can encourage stigmatizing beliefs by ignoring environmental and social barriers to disability [18, 36]. In contrast, a social model perspective would focus on overcoming attitudinal and structural barriers—including healthcare professionals' misconceptions—that impede full involvement and inclusion rather than “fixing” the stutterer [18]. Thus, the knowledge gaps and stereotypes identified in this study are more than just educational deficits that can be addressed through curriculum content; they are manifestations of a broader societal prejudice that, if not addressed, will continue to shape the clinical encounters and care pathways available to people who stutter. Future research should look into how to better educate the general public on stuttering, as well as which sources are the most effective and widely used by people interested in learning more about it.

Limitations

This study has several limitations that should be acknowledged. First, as with any self-report instrument, responses may be influenced by individual interpretations of survey items, which can vary across cultural, educational, and social contexts, and reflect what participants believe or feel, which may differ from actual behavior in real interactions with people who stutter. Such variability may affect the consistency and comparability of reported attitudes. Second, given the single-center sample and overrepresentation of female participants, the generalizability of these findings is constrained, and the reliance on a convenience sample of medical and health sciences students limits the generalizability of findings to broader populations. Third, while the survey provides valuable quantitative insights, it does not capture the nuanced reasoning behind attitudes, underscoring the need for complementary qualitative approaches in future research. Future studies should examine ways to better educate the general public about stuttering, as well as which sources are most effective and widely used by those seeking to learn more about it. Finally, the study involved multiple statistical comparisons across demographic groups, which may increase the likelihood of Type I error. Consequently, some statistically significant associations may represent chance findings and should be interpreted with caution.

Conclusion

The findings demonstrate substantial gaps in accurate knowledge and the presence of negative stereotypes among future healthcare professionals, with marked disparities across academic disciplines. Audiology and Speech students consistently outperformed other groups, whereas students in anaesthesia, perfusion, and dentistry frequently exhibited misconceptions. Notably, beliefs that stuttering increases vulnerability to mental problems

and social neglect were widespread, reinforcing the presence of stigmatizing attitudes. These patterns indicate a need for discipline-specific educational interventions to improve foundational understanding and challenge harmful stereotypes. Overall, this study provides baseline evidence to inform curriculum development, but does not directly assess clinical competency or patient-care outcomes.

Abbreviation

PWS Person/People Who Stutter

Supplementary Information

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Supplementary Material 1.

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Authors' contributions

R.D., S.K., A.H., and M.A.* conceptualized and designed the study. M.A.B., S.K., R.H., D.O., R.Z., F.O., R.E., H.J., and T.N. handled data collection and fieldwork. A.H., S.A., M.G., M.A., and M.R. carried out data analysis and interpretation, data collection, and questionnaire design. S.K., D.O., S.A., and R.Z. wrote the initial manuscript. R.H., F.O., R.E., H.J., R.D., and T.N. all contributed to the literature review and manuscript preparation. A.H., S.A., M.G., M.A.B., and M.R. thoroughly reviewed the paper for significant intellectual content. M.A.* supervised the study and gave general guidance. All authors reviewed, approved the final manuscript, and agree to be accountable for all aspects of the work.

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Data availability

The datasets and analyzed during the present research are available from the corresponding author on reasonable request.

Declarations

Ethics approval and informed consent to participate

The study was approved by the Institutional Review Board (IRB) of An-Najah University in Nablus, Palestine (H.sp 2023/8), and was performed in compliance with the Helsinki Declaration for research in humans. Prior to their inclusion in the study, all participants were required to provide informed consent by clicking the agreement button at the beginning of the online questionnaire. Those who did not click to agree to the consent form were automatically excluded from participation and were unable to proceed to the survey. The consent form clearly outlined the study's objectives and guaranteed that participation was both anonymous and voluntary, with no penalties imposed for choosing not to participate.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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