

Medical Students' Attitudes Towards Disability Before and After a Five-Day Community-Based Immersion Program

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Abstract

Background

People with disabilities (PwD) have unmet health needs, partly because some healthcare professionals reports discomfort, anxiety or insufficient preparedness when caring for PwD. Enhancing patients' well-being and improving relationship between healthcare professionals and patients are important goals that could be achieved by improving disability-related training in medical curriculum.

Aim

This study aimed to assess the impact of an immersion program in community-based disability service settings on second-year medical students' attitudes towards PwD, as well as their comfort levels, anxiety, and social skills.

Methods

This monocentric observational study was based on routinely collected educational evaluation data from second-year medical students participating in a five-day immersive placement in disability support settings, where they shared daily activities and interacted directly with PwD outside the healthcare setting. The Attitudes Toward Disabled Persons (ATDP) scale and the Interaction with Disabled Persons (IDP) scale were administered before and after the placement to assess changes in students' attitudes and reactions towards PwD. Only students who completed both pre- and post-intervention questionnaires were included in the statistical analysis.

Results

Seventy-eight students completed both questionnaires. Significant improvements were observed in total IDP ($p < 0.001$) and ATDP ($p = 0.043$) scores following the immersion program. IDP subscale scores also significantly improved for discomfort, perceived social competence, and coping ($p < 0.001$), whereas no significant change in succumbing, anxiety or vulnerability was observed. No significant differences were found according to gender. However, baseline IDP scores and changes following the immersion program differed according to previous personal or professional contact with PwD.

Conclusion

A five-day immersion program with PwD was associated with improvements in medical students' attitudes towards disability, reduced discomfort, and improved perceived social competence and coping. These findings support the value of direct contact and meaningful interactions with PwD as part of medical education. However, such experiences should be integrated into a broader, longitudinal disability-related curriculum to promote sustained changes in attitudes and clinical practice.

BACKGROUND

The International Classification of Functioning, Disability and Health (ICF), widely used in fields such as physical medicine and rehabilitation (PMR), describes disability from a biopsychosocial perspective as resulting from the interaction between impairments, activity limitations, participation restrictions and environmental factors [1]. A study conducted by Mitra et al. between 2002 and 2004 found that 14% of adults in 54 countries worldwide had a disability [2]. The 2011 World Report on Disability suggested a prevalence of 15%, including children. The Global Report on Health Equity for Persons with Disabilities (PwD) (WHO, 2022) concludes that PwD have more chronic illnesses, use health services more frequently and require more preventive, curative and rehabilitative care and follow-up. However, they also face greater barriers to accessing care [3]. Studies consistently show that PwD have more unmet health needs. An international review of 51 studies confirmed major inequalities in access to care across all continents, highlighting this issue [4]. The main persistent barriers identified are related to cost, a shortage of trained professionals, inaccessible facilities, and discrimination [3–5].

The stigmatisation of PwD is closely linked to the negative attitudes they may encounter both inside and outside hospitals. Furthermore, the attitudes of healthcare professionals towards PwD can be either positive or negative depending on their personality traits [6, 7]. Several studies have shown that some healthcare professionals experience fear and anxiety when faced with the challenge of caring for a disabled patient, particularly one with a physical disability [8]. These feelings can be accompanied by prejudices and conscious or unconscious discrimination, as well as lower expectations of PwD among healthcare professionals. When asked to describe PwD before encountering them, medical students tend to use words that refer to depersonalised accessories, loss and absence (85%), as well as negative personal traits or victimisation (74%) [9]. A lack of understanding of disabilities among healthcare staff and insufficient funding for longer consultations dedicated to PwD are other factors that can explain the deterioration of the healthcare professional-patient relationship [10]. The difficulties in interaction between healthcare professional and PwD, as well as healthcare professionals' negative perception of PwD, have already been studied in several international studies [11, 12]. Some studies have found consistent results indicating that healthcare students and professionals have more favourable attitudes towards PwD than the general population [8, 13]. With increasing clinical and social experience, there is a statistically significant difference in comfort with difficult clinical situations, especially in physical medicine and rehabilitation, but not according to gender [14]. Furthermore, medical students with a more positive attitude towards PwD are more likely to feel comfortable in challenging rehabilitation situations [13].

In order to improve communication, interaction and collaboration between healthcare professionals and PwD, and to combat the negative perception of healthcare professionals towards disabled patients, it is necessary to encourage the new generation of healthcare professionals to gain knowledge and experience, and to increase their awareness to the needs of PwD, in order to create a relationship that promotes their health. Training on disability is needed, but there is little consensus on what should be taught to provide quality care to patients with all types of disabilities. A 2020 American study by Havercamp et al. [15], aimed to map the specific health needs of PwD. Six competencies, 49 sub-competencies and 10 principles and values emerged from the study, covering topics such as respect, person-centred care and awareness of physical, attitudinal and communication barriers.

Several national and international teams have attempted to establish educational programs and immersion program in medical and social settings in order to make progress in this area. Byron et al. proposed a four-day course on disability, comprising modules led by teachers who are themselves PwD, as well as workshops on communication and visits to various medical and social facilities [9]. Bessaguet et al. demonstrated in 2025 that a one-week disability awareness training program, delivered to third-year medical students, comprising theoretical

sessions, practical workshops with PwD, three days of immersive training and an artistic performance involving PwD significantly improved comfort in interactions and reduced prejudiced and discriminatory attitudes [16].

For the past six years, our university has offered an immersion program to second-year medical students. The immersion program aims to educate future physicians about disabilities, with the hope of improving the caregiver/patient relationship and, above all, the health of children and adults with disabilities in the long term. This study aims to assess the impact of a five-day immersion program on the perceptions of PwD among second-year medical students. We will examine the effects of the program on factors such as attitudes towards PwD, comfort levels, anxiety and social skills. Through this study, we hope to find new ways to optimise the curriculum for medical students regarding disability-related care.

METHODS

Type of study

This observational, descriptive, monocentric was study conducted at the Faculty of Medicine and Midwifery, University of Reims Champagne-Ardenne, Reims, France. It was based on routinely collected educational evaluation data. The questionnaires were administered as part of the routine evaluation of the educational program, with the aim of assessing its educational impact and informing curriculum improvement. The present study reports a secondary analysis of these educational data.

Under French regulations, this study falls within the scope of educational research and does not meet the definition of research involving human participants (“recherche impliquant la personne humaine”) under Articles L.1121-1 and R.1121-1 of the French Public Health Code (Loi Jardé). Article R.1121-1 specifically excludes research evaluating teaching practices in the field of health from the scope of research involving human participants. Consequently, review by a French Comité de Protection des Personnes (CPP) was not required. The study was conducted in accordance with applicable French regulations and the ethical principles of the Declaration of Helsinki.

Data were collected in pseudonymized form as part of the routine evaluation of the educational program. Each student was assigned a unique participant code, which was used to match pre- and post-program questionnaires. Before completing the questionnaires, students received oral information about the purpose of the evaluation, the data collection procedures, and the potential use of the data for scientific communication and publication. Completion of the questionnaires was voluntary, and no personally identifiable information was collected. Students were informed that their decision whether or not to complete the questionnaires would have no impact on their education or academic assessment and that participation would not be graded. Informed consent to participate and to use the collected data for research purposes was indicated by voluntary completion of the questionnaires after receiving this information.

The intervention

The intervention is detailed in the Supplementary Material (S1). A detailed description of the intervention according to the Template for Intervention Description and Replication (TIDieR) checklist is provided in Supplementary Material S2. Shortly, it consisted of a one-day presentation for students, featuring talks from professionals working in various disability support services, as well as testimonies from PwD and their caregivers. This was followed by a five days immersion program in facilities and community-based services supporting

children or adults with disabilities in their daily lives throughout the region. Finally, there was a half-day group feedback session, where students could share their experiences. During the immersion program, students were encouraged to interact with PwD. The program had no clinical care objectives, and students did not provide medical or nursing care.

Subjects

All second-year medical students at the Faculty of Medicine and Midwifery, University of Reims Champagne-Ardenne were eligible to participate in the study. Inclusion criteria included being over 18 years old, agreeing to complete the evaluation questionnaires, and completing both questionnaires before and after the educational intervention with no missing data. Medical students who completed only one questionnaire or had missing data were excluded from the analysis.

Data collection

Demographic information was collected and included age, gender, whether or not the respondent had a relative with a disability, and whether or not they had previous work experience with PwD.

Disability Perception was assessed using Attitudes Toward Disabled Persons (ATDP) scale and the Interaction with Disabled Persons (IDP) scale.

The ATDP scale was originally developed by Yuker, Block, and Campbell (1960) [17], later revised by Yuker, Block, and Youngg, 1966) [18]. The IDP scale was developed by Gething (1991) [19].

The Attitudes Toward Disabled Persons (ATDP) Form B is a 30-item questionnaire assessing general attitudes toward people with disabilities. Each item is rated on a six-point Likert scale ranging from + 3 (strong agreement) to - 3 (strong disagreement), with no neutral response option. According to the original scoring procedure described by the scale developers, the signs of positively worded items were reversed. Item scores were then summed algebraically, the sign of the resulting sum was reversed, and a constant of 90 was added. Total scores range from 0 to 180, with higher scores indicating more positive attitudes toward people with disabilities.

The IDP is a questionnaire designed to measure the level of discomfort, awkwardness or anxiety experienced during social interactions between people with and without disabilities. Consisting of 20 items, it measures negative reactions and emotions. The response scale is a 1–6 Likert scale (1 = strongly disagree, 6 = strongly agree). The final score is obtained by adding up all the item scores after reverse-scoring. The total score can range from 20, indicating a very positive attitude, to 120, reflecting a more negative attitude or high discomfort. A score of 20–40 corresponds to a very positive attitude and ease; a score of 40–60 reflects a fairly positive attitude; a score of 60–80 falls into an intermediate zone; a score of 80–100 highlights a fairly negative attitude and noticeable discomfort; and a score over 100 reflects a high level of discomfort linked to a very negative attitude.

The questionnaires were completed before the program and again immediately after completion of the educational program. The data were collected using LimeSurvey® software (LimeSurvey GmbH, Papenreue 63 22453 Hambourg/Allemagne.)

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics version 28. Only students who completed all items of both questionnaires at both pre- and post-program assessments were included in the analysis. Therefore, the final dataset contained no missing data, and no data imputation was performed.

Continuous variables were described using the mean and standard deviation (SD), as well as the median and interquartile range (IQR). Categorical variables were summarised using frequencies and percentages. The normality of the continuous variables and of paired pre–post differences were assessed using the Shapiro–Wilk test, as well as through visual inspection of histograms and Q–Q plots. Levene's test was used to assess homogeneity of variances for comparisons between independent groups.

Changes in ATDP and IDP total and subscale scores between the pre- and post-intervention assessments were analysed using paired Student's t-tests. Wilcoxon signed-rank tests were performed as sensitivity analyses to assess the robustness of the findings. Comparisons between participants with and without previous personal or professional interactions with PwD were primarily performed using independent Student's t-tests. Mann–Whitney U tests were conducted as sensitivity analyses. Having previous interaction with PwD was defined as having either a family member or close acquaintance with a disability, and/or previous professional experience involving persons with disabilities.

All statistical tests were two-sided and were considered statistically significant at $p < 0.05$.

RESULTS

Of the 205 eligible students, 78 met the inclusion criteria. Figure 1 presents the study flowchart.

The median age was 20 years (IQR 1 year), with 67.9% of participants being women. Thirty students (38.5%) reported having a PwD in their close social circle. Of these, the person was a parent to six students (7.7%), a sibling to three (3.8%), an uncle or aunt to nine (11.5%), a cousin to eight (10.3%), a grandparent to five (6.4%), a friend to four (5.1%), and another relative or acquaintance to 14 (17.9%). Eleven students (14.1%) had previous professional experience working with a PwD. In total, 36 students had previously interacted with a PwD.

The mean ATDP score increased from 106.6 (SD 17.0) before the immersion program to 109.7 (SD 19.9) after the program ($p = 0.043$). However, this difference did not reach statistical significance in the sensitivity analysis using the Wilcoxon signed-rank test ($p = 0.091$). Analysis of the total score results from the IDP self-questionnaire completed before the immersion program (IDP1) shows an intermediate mean value, reflecting a certain level of discomfort, anxiety or negative attitude towards PwD. Analysis of the results of the post-immersion program self-questionnaire (IDP2) shows a significant improvement in the total score ($p < 0.001$), with sub-scores improving mainly in the areas of discomfort, perceived social competence and coping. However, there was no significant improvement in succumbing, anxiety, or vulnerability. Table 1 presents the detailed results. Figure 2 shows how individual scores changed between the pre- and post-immersion program assessments.

Table 1
Pre- and post-immersion program test results

	Before intervention				After intervention				t-test	Wilcoxon
	mean	SD	median	IQR	mean	SD	median	IQR		
ATDP	106.6	(17)	107.5	[24]	109.7	(19.9)	108	[16.9]	0.043	0.091
IDP total score	62.1	(9.6)	64	[12.2]	57	(8.5)	58	[9.2]	< 0.0001	< 0.0001
IDP Sub score :										
- Discomfort	2.8	(0.9)	2.8	[1.2]	2.1	(0.7)	2.1	[1]	< 0.0001	< 0.0001
- Succumbing	2.5	(0.4)	2.5	[0.5]	2.5	(0.4)	2.5	[0.5]	0.729	0.871
- Social Skills	3.4	(0.9)	3.6	[1.2]	2.8	(0.7)	2.8	[0.8]	< 0.0001	< 0.0001
- Anxiety	4	(1)	4	[1.5]	3.9	(1.1)	4	[2]	0.374	0.502
- Coping	3.2	(0.8)	3.5	[1.5]	2.7	(0.8)	2.5	[1]	< 0.0001	< 0.0001
- Vulnerability	4.3	(1)	4.5	[1.5]	4.2	(1.2)	4.5	[1.5]	0.417	0.468
<i>IDP = Interaction with Disabled Persons scale; ATDP = Attitude Toward Disabled Persons ; SD : standard deviation ; IQR : interquartile range</i>										

There was no significant difference in baseline ATDP and IDP total scores according to gender ($p = 0.615$ and $p = 0.710$, respectively). However, baseline IDP total scores, but not ATDP scores, differed significantly according to previous personal or professional contact with PwD ($p = 0.004$ and $p = 0.098$, respectively). Within the IDP, participants with previous contact with PwD had lower scores on the Discomfort, Succumbing, Social Skills and Coping subscales, indicating less negative reactions towards PwD. Following the immersion program, however, improvement in IDP scores was greater among participants without previous contact with PwD ($p = 0.043$). For the IDP subscales, differences between groups were less consistent across the primary and sensitivity analyses. The complete results are presented in Table 2.

Table 2
difference between student with or without previous personal or professional contact with persons with disabilities)

	Students without previous contact				Students with previous contact				T- test	Mann Withney
	mean	(SD)	median	[IQR]	mean	(SD)	median	[IQR]		
Initial										
ATDP	103.9	(14.8)	104	[21.7]	109.6	(18.9)	111.5	[28]	0.098	0.142
IDP total score	65	(8.4)	66	[8.5]	58.8	(9.8)	58	[14.7]	0.004	0.005
IDP sous score										
- Discomfort	3	(0.8)	3.1	[0.9]	2.5	(0.9)	2.5	[1.5]	0.031	0.031
- Succumbing	2.6	(0.4)	2.5	[0.75]	2.4	(0.5)	2.2	[0.6]	0.049	0.033
- Social Skills	3.7	(0.9)	3.8	[1]	3.2	(0.8)	3	[1.3]	0.011	0.006
- Anxiety	4.1	(1)	4	[1.6]	4	(1.1)	4	(1)	0.642	0.715
- Coping	3.4	(0.8)	3.5	[1]	3	(0.8)	3	[1]	0.02	0.022
- Vulnerability	4.4	(1)	4.5	[1.1]	4.2	(1)	4	[1.5]	0.339	0.378
Pre- post- difference										
ATDP	3	(12.6)	4.5	[19.5]	3.1	(13.9)	1	[16.7]	0.677	0.991
IDP total score	6.8	(8)	7	[12]	3.2	(6.9)	2	[7.5]	0.043	0.045
IDP sous score										
- Discomfort	0.7	(0.7)	0.8	[1]	0.5	(0.6)	0.3	[0.8]	0.181	0.095
- Succumbing	0.02	(0.4)	0.7	[0.5]	0.0.2	(0.5)	0	[0.5]	0.924	0.902
- Social Skills	0.7	(0.7)	0.7	[1]	0.4	(0.6)	0.4	[0.8]	0.048	0.083
- Anxiety	0.2	(1)	0	[1.1]	0	(0.8)	0.25	[1]	0.412	0.665
- Coping	0.6	(0.9)	0.5	[1]	0.3	(0.7)	0.2	[0.5]	0.056	0.032
- Vulnerability	0.1	(0.9)	0	[1]	0	(0.9)	0	[1]	0.533	0.616
IDP = Interaction with Disabled Persons scale; ATDP = Attitude Toward Disabled Persons ; SD : standard deviation ; IQR : interquartile range										

DISCUSSION

Our study suggests that a five-day immersion program was associated with significant improvements in medical students' disability-related attitudes and reactions. The program was associated with improvements in students' perceived ability to interact with PwD, as reflected by significant improvements in the total IDP score ($p < 0.001$), as well as a modest improvement in the ATDP score ($p = 0.043$). However, the latter was not statistically significant in the sensitivity analysis using the Wilcoxon signed-rank test ($p = 0.091$).

Despite differences in their content, duration and outcome measures, our findings are consistent with previous studies evaluating disability-awareness programs. In France, Bessagnet et al. reported increased empathy, reduced stereotypes and greater confidence following a one-week program combining theoretical teaching, practical workshops and immersion. Benefits were still observed three months later [16]. Similarly, Crotty et al. reported greater comfort when interacting with PwD following a four-week program combining rehabilitation placements, community visits, disability simulation and theoretical teaching [20]. Khoudarchah et al. observed significant improvements in IDP scores following a 10-week interdisciplinary program involving disability advocates, healthcare professionals, and PwD [21]. By contrast, Cecchetti et al. observed significant improvements immediately after the intervention, which were no longer evident one year later. This highlights the challenge of maintaining these effects over time [22].

Overall, these findings suggest that immersive disability awareness programs may improve students' attitudes and reactions towards PwD, although the extent and longevity of these changes appear to depend on the educational approach and the timing of the assessment.

Using the ATDP and IDP questionnaires together provides a more comprehensive understanding of the changes associated with the immersion program. While the ATDP measures overall attitudes towards PwD, the IDP explores the perceptions and feelings associated with interacting with them in more detail. Prior to the immersion program, our second-year medical students' mean ATDP score was 106.6. Following the intervention, this score increased to 109.7, a difference that was statistically significant in the primary analysis ($p = 0.043$), although it did not reach statistical significance in the sensitivity analysis ($p = 0.091$). This discrepancy suggests that the observed improvement in ATDP scores should be interpreted cautiously. Previous studies have reported conflicting findings regarding baseline attitudes towards PwD. While some studies have described generally positive attitudes despite persistent discomfort or lack of confidence [8], others have reported ATDP scores indicative of more negative perceptions [13, 14]. Similarly, not all educational interventions have been shown to significantly improve ATDP scores. For example, Smeltz et al. found no significant change following a disability curriculum for first-year medical students [23]. It should also be noted that the ATDP questionnaire may have limitations in detecting changes in attitudes over time [24]. Comparisons between studies using different follow-up periods should therefore be interpreted cautiously.

A more detailed analysis of the IDP showed that changes following the immersion program varied across different areas. Significant improvements were observed in terms of discomfort, social skills and coping, whereas no significant changes were found in relation to succumbing, anxiety or vulnerability. This pattern suggests that the immersion program was primarily associated with improvements in students' confidence and comfort when interacting with PwD, rather than changes in all aspects of their emotional responses to disability. This interpretation is consistent with previous studies reporting improvements in discomfort, empathy and reduced stereotypes, as well as increased confidence, following disability awareness programs [16, 21, 25–30]. For

example, Adler et al. observed increased confidence in examining PwD after only one day of teaching combined with two days of direct contact [30].

These findings emphasise the importance of using different outcome measures together. While the ATDP captures changes in students' general attitudes towards disability, the IDP identifies the specific relational dimensions for which immersive educational experiences are most effective. In the context of an immersion program based on direct contact with PwD, the IDP may therefore provide particularly relevant information that is not captured by a general measure of disability attitudes alone.

The different patterns observed in the responses to the ATDP and IDP questionnaires may also help to explain how immersive programs are associated with changes in students' attitudes towards PwD. The robust improvement in IDP scores, compared with the more modest and less robust change in ATDP scores, suggests that the immersion program may have had a greater effect on students' reactions to interactions with PwD than on their general attitudes towards disability. Our findings are consistent with Allport's intergroup contact theory, which suggests that direct, repeated and meaningful interactions between members of different social groups can reduce stereotypes and prejudice. This occurs by challenging preconceived ideas and promoting a better understanding of the abilities, needs and life experiences of others [31]. The greater improvements observed in the relational dimensions of the IDP are therefore consistent with the hypothesis that direct contact primarily increases students' comfort and confidence when interacting with PwD.

However, our results also suggest that contact alone may not be enough. Despite five days of immersion, no significant improvements were observed in dimensions related to anxiety, vulnerability, or succumbing. This suggests that immersive experiences may be particularly effective in improving interpersonal confidence, whereas more deeply rooted emotional responses may require different educational approaches or repeated experiences over time. From an educational perspective, disability should not be considered a 'special' topic that is addressed through isolated teaching sessions. Instead, it should be integrated throughout the medical curriculum [32]. The quality of contact appears to be more important than the quantity [33]. Involving PwD as teachers or standardised patients, providing authentic opportunities to interact with PwD, and encouraging students to reflect on and discuss their experiences are likely to promote meaningful changes in attitude [5, 34, 35]. However, disability simulation performed by non-disabled actors should be approached with caution, as it may lack authenticity and inadvertently reinforce stereotypes [15].

These findings support the use of a multimodal approach in disability education. Throughout medical training, immersive experiences should be combined with theoretical teaching, structured debriefing, and repeated opportunities for meaningful contact with PwD. Further research is needed to determine whether these educational gains are maintained over time and, more importantly, whether they result in measurable changes in clinical practice.

Baseline IDP scores differed according to whether or not students had previously had personal or professional contact with PwD. Those who had previous contact had lower IDP scores before the immersion program, indicating less discomfort and more positive reactions when interacting with PwD. This finding is consistent with previous studies which suggest that contact with PwD is associated with more favourable attitudes [8, 22, 36]. However, students with no prior experience showed greater improvement in total IDP scores following the immersion program, suggesting the changes associated with the program were greater among those with less exposure to disability. This may be because they had less favourable baseline IDP scores and a greater potential

for change. The greater improvement observed among students with no prior experience may also reflect a ceiling effect, as those with experience already exhibited more favourable baseline IDP scores, leaving less room for improvement. In contrast, baseline ATDP scores and changes in ATDP scores did not differ significantly according to previous contact with PwD. This difference between the two measures may suggest that previous contact is more closely associated with reactions to interactions with PwD than with general attitudes towards disability. The influence of previous contact remains a controversial topic in the literature, with several studies reporting no association between prior contact and attitudes towards PwD [16, 28, 37, 38]. These discrepancies suggest that the nature, quality and frequency of contact may be more important than its mere existence.

Our study has several limitations. Firstly, the absence of a control group limits causal interpretation of the observed pre–post changes. In addition, the relatively small sample size and participation rate may have reduced our ability to detect smaller changes, potentially introducing a selection bias towards students with a greater initial interest in disability. Secondly, as both questionnaires were self-administered, they were susceptible to social desirability bias, although the fact that they were completed anonymously may have limited this effect. Moreover, these questionnaires assessed self-reported attitudes and reactions rather than actual behaviour or clinical competence. The outcomes were assessed immediately after the immersion program, which prevented any conclusions being drawn about the long-term persistence of the observed changes or their translation into actual clinical behaviours. Despite these limitations, our study has several strengths. To our knowledge, it is one of the few studies to combine the ATDP and IDP questionnaires, thereby providing additional information on overall attitudes and specific interaction dimensions with PwD. Additionally, the immersive nature of the curriculum exposed students to a variety of authentic disability support and community settings, enabling them to have repeated contact with PwD throughout the week.

CONCLUSION

Stereotypical beliefs can directly impact the delivery of medical services to patients, thereby affecting outcomes. Negative attitudes often stem from a lack of knowledge or uncertainty about how to interact with PwD. A better understanding can reduce anxiety and avoidance behaviours, thereby promoting positive attitudes. In order to reduce the barriers this population faces in accessing high-quality healthcare, medical training programs should address disability throughout the curriculum and provide opportunities for meaningful interaction with PwD.

The results obtained across different curricula can be influenced by factors such as the duration of the intervention, the type of intervention (theoretical or practical), the timing within the medical curriculum, the timing of post-intervention assessments and the questionnaires used. Repeated learning opportunities and direct contact with PwD may contribute to the development of relevant skills while exposing students to the diversity of life situations, not just care contexts. This may promote a shift from a deficit-centred perspective to a more comprehensive view, as well as the development of empathy. In our study, a five-day immersion program based on direct and repeated contact with PwD was associated with marked improvements in students' reactions to interactions with PwD, particularly in discomfort, social skills and coping. Changes in general attitudes measured by the ATDP were more modest and should be interpreted cautiously, as the improvement observed in the primary analysis was not confirmed by the sensitivity analysis. These findings support combining theoretical teaching with meaningful direct contact with PwD, rather than relying on isolated disability-related teaching.

Further studies should determine whether these changes persist over time and translate into changes in clinical behaviour. Individual characteristics, including personality traits, may also influence students' baseline attitudes

and their responses to disability-related educational interventions. Future studies could explore this potential influence and whether it could help tailor disability education programs.

LIST OF ABBREVIATIONS

International Classification of Functioning, Disability and Health (ICF)

Physical medicine and rehabilitation (PMR)

People with disability (PwD)

Statistical Package for the Social Sciences (SPSS)

Interaction with Disabled Persons scale (IDP)

Attitudes Toward Disabled Persons scale (ATDP)

Declarations

Ethics approval and consent to participate :

Under French regulations, this study falls within the scope of educational research and does not meet the definition of research involving human participants (“recherche impliquant la personne humaine”) under Articles L.1121-1 and R.1121-1 of the French Public Health Code (Loi Jardé). Article R.1121-1 specifically excludes research evaluating teaching practices in the field of health from the scope of research involving human participants. Consequently, review by a French Comité de Protection des Personnes (CPP) was not required. Before completing the questionnaires, all students received oral information about the purpose of the evaluation, the data collection procedures, and the potential use of their data for research, scientific communication, and publication. Participation was voluntary and students were informed that their decision whether or not to participate would have no impact on their education or academic assessment. Informed consent to participate and to use the collected data for research purposes was indicated by voluntary completion of the questionnaires after receiving this information. The study was conducted in accordance with applicable French regulations and the ethical principles of the Declaration of Helsinki.

Consent for publication:

Not applicable.

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Author Contribution

All authors contributed to the conceptualisation of this study and read and approved the final manuscript. LDB: Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. FCB: Writing – review & editing, Validation, Investigation, Formal analysis, Data curation. DG: Writing – review & editing, Project administration, Conceptualization, Validation. SCM: Review & editing, Project administration. Aline Gérard: Writing – review & editing, Supervision, Project administration. ASF: Review & editing, Project administration. HB: Review & editing. RT: Writing – review & editing, Supervision, Software, Formal analysis, Data curation Conceptualization, Validation. AR: Writing – review & editing, Project administration, Methodology, Supervision, Software, Formal analysis, Data curation, Conceptualization, Validation

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Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Figures

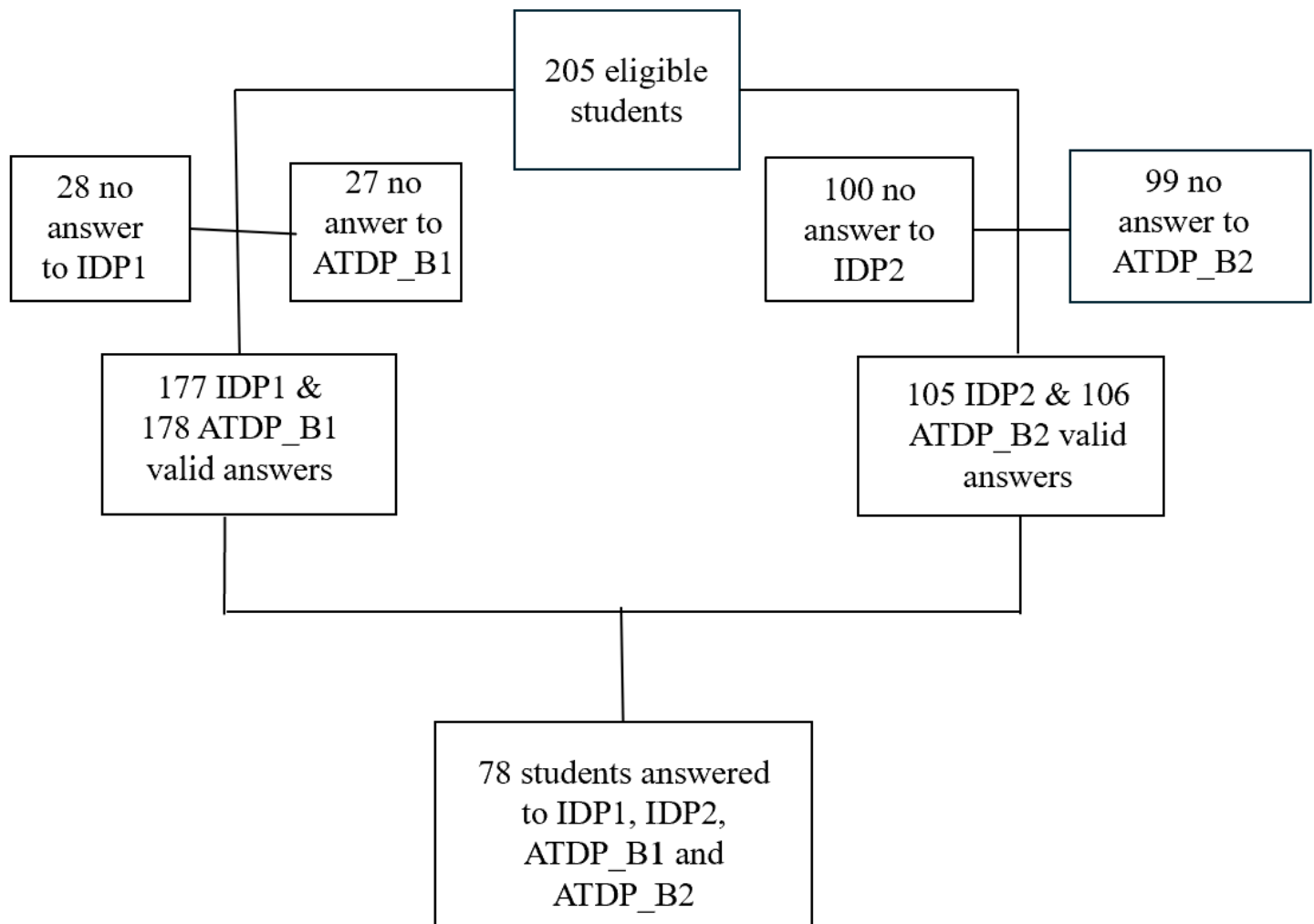


Figure 1

Flowchart, student participation for the different questionnaires

ATDP = attitude toward disabled persons ; ATDP_B1 : b form, before intervention, ATDP_B2 : B form, after intervention ; IDP = interaction with disabled persons scale , IDP1 before intervention, IDP2 after intervention

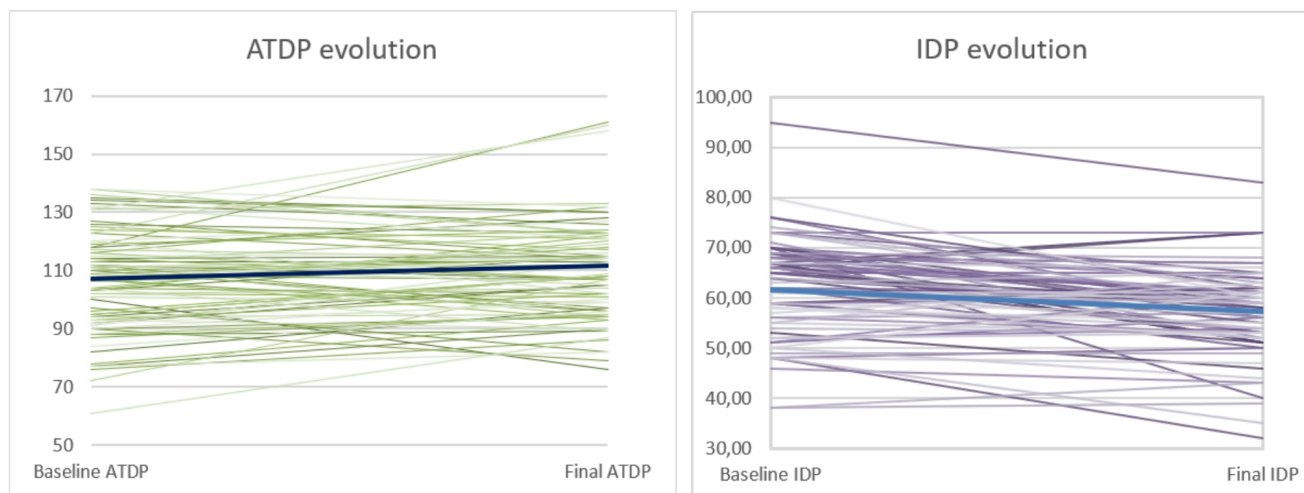


Figure 2

score evolution

ATDP = attitude toward disabled persons ; IDP = interaction with disabled persons scale

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