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Knowledge and barriers to inclusion of ASC pupils in Scottish mainstream schools: a mixed methods approach

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ABSTRACT

Inclusion of autistic pupils into mainstream schools is common practice and staff should have adequate knowledge on teaching and managing classroom behaviour. However, autism knowledge among teaching staff may be inconsistent. A mixed-methods design examined differences between school staff in autism knowledge, perceived barriers to inclusion and required support. 138 early years staff, school teachers and pupil support assistants took part. Knowledge and experience were assessed using Knowledge about Childhood Autism among Health Workers questionnaire (KCAHW; [Bakare, M. O., P. O. Ebigbo, A. O. Agomoh, and N. C. Menkiti. 2008. Knowledge about childhood autism among health workers (KCAHW) questionnaire: description, reliability and internal consistency. *Clinical Practice and Epidemiology in Mental Health* 4 (1): 17]). Qualitative measures addressed perceived barriers to inclusion and recommended supports. Significant differences in the knowledge of autism scores were shown. Similar themes were identified across all staff, with five themes reflecting barriers to inclusion (Knowledge, Support, Training, Management of ASC features and Parent involvement) and four themes relating to required support (Individualising educational experience, Changes to learning spaces, Opportunities to learn about ASC and Communication). Government inclusion policy should take a whole school approach and consider staffs' actual and perceived barriers to inclusion of autistic children.

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Autism Spectrum Condition (ASC) is a neurodevelopmental condition described and identified in the DSM-5. It is characterised by difficulties in social interaction and communication, and repetitive and restricted interests (American Psychiatric Association [APA] 2013). Impairments in these diagnostic domains manifest in varying degrees and are dependent on ability and developmental age, resulting in a heterogeneous group (Frith, 2003). A central feature of ASC is sensory issues (Robertson and Baron-

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Cohen 2017) which are linked to challenging behaviours that are detrimental to a child's learning ability (McDonnell et al. 2015). Due to the complex interplay of social, cognitive, and sensory profiles in autism, individuals vary in the type of support they need both within and beyond the classroom. Although support can be required at home throughout the lifespan, particular attention should be paid to educational environments. The current study aims to examine the knowledge, experience, and training of different groups of educational practitioners as well as exploring their perceptions and understanding of inclusion of autistic children.

ASC and mainstream education

The Scottish Government has introduced policies that give high priority to the principles of early intervention and promote the inclusion of children who have Additional Support for Learning (ASL) needs into mainstream classrooms (The Scottish Government 2010). In 2010, The Scottish Government invested £10M to support The Scottish Strategy for Autism, which highlights the need to consider ASC in the early years, primary and secondary school stages (Scottish Government 2010); this has informed the design of the current study.

Current estimates state that approximately 70% of autistic children are taught in mainstream schools across the UK (Department for Education 2012). McConkey (2020) reports that around 2.5% of all pupils attending schools in Scotland have a diagnosis of ASC. With higher rates in secondary (approximately 2.5%) than primary school (approximately 2%). This is significantly higher compared to estimates of earlier studies that reported autism prevalence within Scottish schools at 0.97% in 2011 (McConkey 2020) and might reflect the Scottish Government's ongoing commitment to a 'presumption of mainstreaming' policy (Scottish Government 2019).

Mainstream is often considered the most beneficial setting for educating autistic pupils since it is often reported to improve educational performance (Myklebust 2006), social development (Baker et al. 1994–1995) and quality of life (Falkmer et al. 2015). However, it should be noted that school attainment for autistic children is generally reported as poorer than that of typically developing children (Howlin and Moss 2012; Levy and Perry 2011) and trends in attainment of autistic children appear variable (Keen, Webster, and Ridley 2016). There can also be considerable challenges associated with inclusion such as behavioural and emotional difficulties leading to social exclusion or bullying (Humphrey and Symes 2013). It has been reported that autistic children are 20 times more likely to be excluded from school than those without support for learning needs (Humphrey 2008) and recent studies have reported high school absence in the autistic population (Munkhaugen et al. 2017; Totsika et al. 2020). Given such findings, it is important to consider barriers and facilitators of successful inclusion.

Barriers and facilitators of inclusion

These exist at the macro, school, and individual level (Barry et al. 2020). At the macro-level, research has suggested that cultural differences (Alotaibi, Dimitriadi, and Kemp 2016), government and authority budgets and the need for multi-disciplinary teams (Donato, Shane, and Hemsley 2014) are important. At the school level, availability of

resources (Locke et al. 2017), time (Silveira-Zaldivar and Curtis 2019), class sizes (Wilson and Landa 2008), staffing (Locke et al. 2015), awareness (Donato, Shane, and Hemsley 2014); and leaders who prioritise inclusive practice impact the success of inclusion (Silveira-Zaldivar and Curtis 2019). In addition, individual teacher level factors have also been found to be influential (Gal, Schreur, and Engel-Yeger 2010; Sharma et al. 2019; Silveira-Zaldivar and Curtis 2019; Wilson et al. 2016, 2019). Despite the existence of many relevant factors, evidence suggests that the onus is often placed on teachers (Haegele et al. 2021). As such, educators play an important role in the implementation of inclusion and thus how positive educational experiences are for autistic children.

The role of educators

Although educators recognise the importance of inclusion (Kurth and Keegan 2012), evidence of their use of inclusive teaching practices is mixed (Jordan and McGhie-Richmond 2014; Roy, Guay, and Valois 2013). There are several factors that impact upon teachers' inclusive practice. For example, evidence suggests that lack of teacher training impacts the success of inclusion (Dillenburger et al. 2016; Sharma et al. 2019; Shyman 2012; Silveira-Zaldivar and Curtis 2019). Dillenburger et al. (2014) found that most training courses for teachers do not include any formal ASC training and consequently impacts on professional development within the job and knowledge of how to support autistic children. The impact of poor training for staff at any level of education does not only have an impact on the child that they are trying to support but also the staff group as a whole. Poorly trained staff can have detrimental effects on service provision and staff morale and can lead to staff burn-out, as well as increased service user anxiety and stress (Dillenburger et al. 2014; Vincent and Ralston 2020). Related to training is the importance of teacher knowledge. Research suggests that teachers with more knowledge are more positive about inclusion (de Boer, Pijl, and Minnaert 2011), however, Finch et al. (2013) found that teachers had limited knowledge about teaching strategies for autistic children. More research is therefore needed to understand teachers' knowledge of ASC as a neurodevelopmental condition.

Evidence suggests that teacher knowledge is related to self-efficacy (Vincent and Ralston 2020). This is important given that successful inclusion of autistic children requires teachers to have high self-efficacy beliefs, i.e. they must have confidence and belief in their professional ability to provide academic guidance and create a positive learning environment for all individuals Sharma, Loreman, and Forlin (2012). Wilson et al. (2016) found that mastery experiences were an important aspect of measuring teachers' self-efficacy. This relates to the belief that they have successfully carried out a behaviour to cope with, or to implement a positive change in the learning environment and they have confidence that they will be able to successfully implement that behaviour in future scenarios. To date, no research has studied the relationship between mastery, teacher training, and knowledge of ASC specifically. Further, limited research has qualitatively explored teacher perceptions of barriers and what is needed to support their inclusive practice.

It should also be noted that research examining teacher variables and ASC tends to focus on either early years, primary or secondary teachers rather than examining all groups simultaneously. This is problematic as evidence suggests that levels of

knowledge differ between teachers and support staff with respect to other neurodevelopmental conditions (Toye, Wilson, and Wardle 2019). There is a need for research which considers ASC training and experience across teacher groups. Further, research which includes and examines pupil support (teaching) assistants (PSAs) is also needed. PSAs in Scotland are essential to the successful inclusion of autistic pupils. Osborne and Reed (2011) found that PSAs helped in reducing social and emotional behavioural challenges in autistic pupils and Rose (2001) reported they were often the primary source of support in the inclusion of those who have ASC. They can provide consistency for the child, moving from class to class and providing one-to-one support. It's also worth noting that many PSAs do not receive any training before starting their jobs and express dissatisfaction with the generic training given on the job (Symes and Humphrey 2011). In addition, recent research investigating PSAs attitudes towards supporting children with other developmental disorders has reported less knowledge and higher levels of stigma amongst PSAs as compared with other education professionals (Toye, Wilson, and Wardle 2019). Despite this, very few studies have considered their role in supporting children who have neurodevelopmental conditions or other ASC needs.

The current study

With the rise of autistic pupils within mainstream education, it is important to examine the preparedness of school staff and the perceived barriers to educating autistic pupils. The current study, therefore, aimed to examine knowledge of ASC, mastery of experience and perceived barriers and supports for teaching autistic children amongst early years, primary teachers, secondary teachers, and PSAs. Differences in ASC knowledge as a function of occupation, training, and experience (time spent working with an autistic child as well as mastery experience) were also examined. In addition, the study aimed to qualitatively explore educational professionals' perceptions of the barriers to successfully working with autistic children and what support they require to improve inclusion in the classroom. It was predicted that there would be a difference in knowledge across the four types of educational staff (early years, primary and secondary teachers and PSAs), difference in training and knowledge, and that knowledge will change with experience gained. Lastly, all these factors would be related to mastery of experience.

Materials and methods

Participants

Early years, primary and secondary staff were recruited through 7 local authorities and 36 schools. Initially, the local authorities were approached and granted permission before schools were then asked if they would like to take part. In total, data was collected from 23 schools and nurseries across Scotland. 175 participants agreed to take part but 37 participants had to be withdrawn due to incomplete questionnaires. Please see Table 1 for the demographic characteristics of the 138 participants.

Table 1. Demographic characteristics of participants.

Groups	Participant numbers	Sex M:F	Age Range; mean; SD (all years)	Experience of working with autistic child (%)	Experience of educating more than 10 autistic children (%)	Experience over 5 years of working with autistic children	Currently working with at least 1 autistic child (%)	1 or 2 children currently under their care (%)	Less than 2 years in role (%)	Formal ASC training (%)	Formal University/ College ASC Training (%)
Early years staff	N = 22	0:22	21-53; 37.5; 8.7	90.9	27.3		54.5	72.3	27.3	27.3	0
Primary staff	N = 25	6:19	24-60; 41.5; 10.4	96	36	48	56	48		36	12
Secondary staff	N = 38	6:32	24-65; 48; 11.7	100	55.3	34.2	68.4	50		34.2	15.8
Pupil support assistants (PSA)	N = 53	4:49	29-64; 48.6; 9.5	100	41.5	54.7	75.5	88.7		52.8	3.8

Measures

Demographic information

Participants were asked to provide information regarding their gender, age, years of general teaching experience (1 = 1–5 years; 2 = more than 5 years), if they had experience of working with autistic children (1 = yes 2 = no), how many years' experience they had teaching autistic children (i.e. 1 = none 2 = less than 2 years 3 = 2–5 years 4 = more than 5 years) and if they had previously received formal autism training (university or college), and if so, what that was.

Mastery experience

Participants were asked to rate themselves on a scale from 1 to 10 (1 being the lowest score and 10, the highest) on their satisfaction with their professional performance on working with autistic children during the past year. In total 121 participants answered this question, of which 86 currently worked with an autistic child. No significant differences were found between staff currently working with an autistic child ($M = 5.76$, $SD = 1.44$) and those who weren't ($M = 5.4$, $SD = 1.38$), $t(119) = 1.25$, $p = .21$, therefore the group was treated as a whole. Previous studies have measured teachers' mastery experience in this way (e.g. Tschannen-Moran and Woolfolk Hoy 2007; Wilson, Woolfson, and Durkin 2018)

ASC knowledge

The Knowledge about Childhood Autism among Health Workers (KCAHW; Bakare et al. 2008) questionnaire was used to assess knowledge of ASC among school staff. The scale comprises of nineteen items with three response options of which, only one is correct. Example items are 'Autism is an auto-immune condition?' and 'Failure to develop peer relationship appropriate for developmental age?'. Correct responses receive a score of one while the remaining two options receive a score of zero. The minimum possible score is zero and the maximum score is 19. The questionnaire is divided into four domains. Domain 1 examines social interactions and has a total subscore of 8, Domain 2 asks about communication and language and has a total subscore of 1, Domain 3 focuses on obsessive and compulsive behaviours and had a total subscore of 4 and lastly, Domain 4 examines comorbid conditions and knowledge about the understanding of the development of ASC and has a subscore of 6. This specific questionnaire has previously been used to assess ASC knowledge in educational settings (eg Ballantyne, Gillespie-Smith, and Wilson 2021). Furthermore, the modification of health measures for use in an educational setting is well established. For example, Kellisona et al. (2010) modified the HIV stigma questionnaire (Berger, Ferrans, and Lashley 2001) to assess ADHD stigma (the ADHD Stigma Questionnaire [ASQ]), a measure subsequently used effectively by others in educational settings and studies of inclusive education (Bell et al. 2011; Toye, Wilson, and Wardle 2019). The reliability and validity of this measure have previously been supported (e.g. Bakare et al. 2008; Igwe et al. 2011).

Qualitative measures

Participants were invited to provide short qualitative responses to supplement the quantitative questionnaires to the following two questions; *What are your perceived barriers in performing your role when supporting those who have ASC?* and *Do you have any suggestions on how to improve the service to support your role?*

The principles of inductive thematic analysis (Braun and Clarke 2006; Clarke and Braun 2013) were used as a guide to explore responses to the above questions. This approach consists of the following 6 stepwise stages: familiarising yourself with your data, generating initial codes, searching for themes, reviewing themes, defining and naming theme and producing the report. The use of thematic analysis allowed for the identification of recurring concepts which were then coded into themes.

Procedure

After ethical approval was obtained, questionnaire packs were distributed to schools and nurseries across Scotland. As agreed by the ethics committee and in line with the British Psychological Society's ethical principles, each pack contained an information sheet, a consent form, the questionnaire and a debrief sheet. It was reiterated that participation was entirely voluntary and that participants could withdraw at any time. The researcher was in attendance when packs were completed and was able to answer any questions that arose.

Results

One hundred and thirty eight school staff ($N = 22$ early years, $N = 25$ primary, $N = 38$ secondary and $N = 53$ PSAs), completed and returned questionnaires. Not all participants answered every question, so responses do not always tally to the total number of participants. Missing cases were minimal (<5%) therefore it was deemed that there was no need for listwise deletion or reconstruction of data.

Participant numbers for individual analysis are reflected within [Table 2](#).

Occupation and domains of ASC knowledge

To explore the role of occupation in general on ASC knowledge, between group comparisons were carried out within each Knowledge Domain. Data were checked for normality and showed normal distribution for each of the four occupations (Early Years, $p = .32$; primary teachers, $p = .70$; secondary teachers, $p = .25$ and PSAs, $p = .26$), therefore parametric analysis was applied throughout. For each Domain a Between Subjects ANOVA was carried out with Occupation being the between factor (4 levels; Early years; Primary; Secondary; PSA). There were significant differences between the Occupations for Domain 1 $F(3, 120) = 4.15$, $p = .01$. Post hoc Bonferroni showed that this effect was driven by Early Years practitioners ($M = 6.80$) who showed significantly higher knowledge scores compared to Primary Teachers ($M = 5.09$; $p = .005$). No other significant differences were found for Secondary Teachers ($M = 5.57$) and PSA ($M = 5.85$). See [Table 2](#) for group means and standard deviations.

For Domain 2 there was a significant effect of Occupation on knowledge scores $F(3, 122) = 3.05$, $p = .031$. Post Hoc bonferroni showed that this effect was driven again by the higher levels of knowledge of Early Years practitioners ($M = 0.90$) compared to Secondary Teachers ($M = 0.54$) $p = .028$. No other significant differences were found for the Primary Teachers ($M = 0.74$) and PSAs ($M = 0.75$).

For Domain 3 there was a significant effect of Occupation on scores $F(3, 123) = 2.72$, $p = .048$ which was driven by a marginal non-significant difference between Early Years practitioners ($M = 3.75$) and Secondary Teachers ($M = 3.06$), $p = .052$. There were no

Table 2. Scores of school staff on the KCAHW questionnaire by domain and total knowledge.

Occupation	Domain 1			Domain 2			Domain 3			Domain 4			Total ASC Knowledge		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Early years	20	6.8	1.32	20	.9	.31	20	3.75	.55	20	3.05	1.36	20	14.5	2.24
Primary teachers	23	5.09	1.3	23	.74	.45	23	3.13	1.01	23	3.3	1.06	23	12.26	2.54
Secondary teachers	35	5.57	2.06	35	.54	.51	35	3.06	.91	34	2.91	1.29	34	11.93	3.03
PSA	46	5.85	1.55	48	.75	.44	49	3.37	1.01	49	3.0	1.21	46	13.09	2.89

significant differences between the other groups, Primary Teachers ($M = 3.13$) and PSAs ($M = 3.37$). There was no significant effect for Domain 4 across the Occupations $F(3, 123) = .50, p = .69$ (Early years = 3.05; Primary Teachers = 3.30; Secondary Teachers = 2.91; PSA = 3.00).

Staff training and total knowledge of ASC

Independent t-tests were carried out for each of the four staff groups to examine differences in total knowledge of ASC and those who had training. For the early years staff, there was a significant difference in knowledge scores between those who had previously received some training ($M = 16.0, SD = 2.1$) and those who had not ($M = 13.86, SD = 2.0$) $t(18) = 2.2, p = .04$. No other differences between the groups' training status and knowledge scores were found.

Experience with ASC and knowledge of ASC

Next, analyses were conducted to determine if there were differences in total knowledge of ASC between those school staff who had more experience of working with a child with ASC. A between-subjects ANOVA found that there were no significant difference in total knowledge scores and staff that had been working with an autistic child for under 2 years, between 2 and 5 years and for over 5 years ($F(2, 111) = .9, p = .41$). There was also a non-significant correlation between those school staff that had responsibility for more autistic children ($M = 2.21, SD = .86$) and total knowledge scores ($M = 13.0, SD = 2.84$) $r = .02, N = 116, p = .87$.

Occupation, ASC experience and knowledge of ASC

Next, we examined the role of both occupation and experience by considering differences in total knowledge of ASC across the four different types of teaching and support staff and ASC teaching experience (i.e. time spent working with an autistic child). A 4×3 between subjects ANOVA was carried out looking at the between factors Occupation (early years, primary, secondary and PSA) and ASC teaching experience (less than 2 years, 2–5 years and more than 5 years). There was a non-significant interaction between Occupation and ASC teaching experience on knowledge of ASC ($F(6, 102) = 1.12, p = .35$) (see [Figure 1](#)) but a trend towards significance for Occupation ($F(3, 102) = 2.56, p = .06$). Bonferroni post hoc analysis showed that there was a significant difference in knowledge scores between early years staff ($M = 14.47, SD = 2.24$) and secondary teachers ($M = 11.93, SD = 3.03$), $p = .01$, showing early years staff scored higher on knowledge scores. There were no other significant differences between the different levels for Occupation. Lastly, there was no main effect of years of experience of ASC ($F(2, 102) = 1.25, p = .29$).

Mastery of experience and knowledge of ASC

Results showed there was a non-significant relationship between total knowledge of ASC scores ($M = 12.89, SD = 2.82$) and Mastery of experience ($M = 5.65, SD = 1.42$) ($r = .11, N = 106, p = .28$).

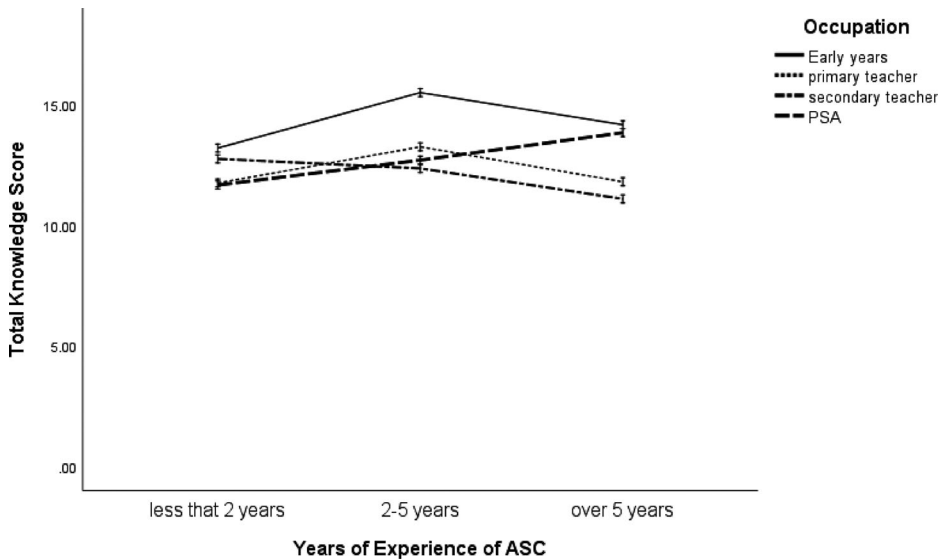


Figure 1. Knowledge scores shown by experience of ASC and occupation.

Qualitative results

Participants were asked to provide brief qualitative responses relating to perceived barriers when supporting autistic children and to provide suggestions of how they could be supported in their role. Themes were considered as a function of each of the participant group (early year, PSAs, primary and secondary teachers). However, the same themes were identified regardless of group (Appendices 1 and 2) and as such, are presented for the sample as a whole (the full data process can be made available upon request).

Five themes were identified as important to staff when considering barriers towards the successful inclusion of autistic children. These were limited ASC training; lack of support (sub-themes; resourcing and information sharing); lack of knowledge about ASC; difficulties in managing ASC (sub-themes; staff efficacy and flexibility) and parental involvement. Descriptions of these themes and supporting data are presented in [Table 3](#).

Four themes were identified as important to staff when considering how to improve educational support for autistic children. These were; individualising educational experiences, changes to learning spaces, opportunities to learn about ASC and communication. Descriptions of these themes and supporting data are presented in [Table 4](#).

Discussion

This study examined knowledge of ASC, mastery of experience and perceived barriers in teaching autistic children amongst early years, primary teachers, secondary teachers, and PSAs. The results showed that overall, early years staff had significantly greater knowledge of ASC in the first three domains. For the early years staff, there was a significant difference in knowledge scores between those who had previously received training compared to those who had not. There were no significant differences in knowledge scores for any group as a function of years' experience or mastery experience. The qualitative data

Table 3. Themes representing perceived barriers of inclusion.

Question: What are your perceived barriers in performing your role when supporting those with ASC?		
Theme	Explanation	Example responses
Limited ASC training	Relates to lack of ASC training offered to staff.	'No training ... lack of skills ...' P2 ST 'Learning on the job ...' P108 ST 'Lack of information about ASC.' P117 PSA
Lack of support	Relates to perceived lack of support to work effectively with autistic children.	'Lack of support ...' P2 ST
Sub-theme 1: Resourcing (i.e. lack of staff numbers for one to one support)	The first sub-theme reflects concerns regarding appropriate human resourcing. It was believed that schools lacked adequate staff numbers needed to provide students with one-to-one support as well as attend to other students in the class.	'Lack of support staff to allow me to work one-to-one ...', P4 ST 'Being on your own without support to deliver a lesson to the whole class.' P5 ST
Sub-theme 2: Information sharing	The second sub-theme concerns participants beliefs about the lack of information sharing about individual pupils and with respect to receiving information from external agencies.	'Lack of information about individual children ...' P110 PSA 'Lack of communication among staff.' P120 PSA 'Trying to get the appropriate support from other agencies.' P 63 EY
Lack of knowledge about ASC	Reflects staff lack of knowledge about ASC symptoms and how the disorder can impact upon learning/support needs.	'Lack of knowledge of what autism is/ not always knowing what the 'label' is' P33, P95 ST 'Not all staff have an understanding of the difficulties that children with ASC have.' P22 PSA
Difficulties in managing ASC	Relates to difficulties in differentiating learning for autistic children and being able to do this for each learner.	'Work not differentiated/Adapting activities to be understood and effective for them' P106, PT
Sub-theme 1: Staff efficacy	The first sub-theme concerns staff efficacy; staff lacked confidence in their ability to successfully adapt practices for autistic students.	'Fear of making things worse.', P 86 PT
Sub-theme 2: Flexibility	The second sub-theme concerns rigid approaches to support, timetabling and curriculum delivery.	'Flexibility of the timetable/demands of delivering the curriculum' P5 ST 'Teachers in mainstream who are not flexible with pupils with ASC' P32 PSA
Parental involvement	Relates to parents' role in successful inclusion and the need for communication between staff and parents.	'Not enough information from parents.' P28, PSA 'Working with the child but parents not supportive ...' P131 PSA

EY = Early years practitioner, PT = Primary Teacher, ST Secondary Teacher, PSA = Pupil Support Assistant.

suggested that limited ASC training, lack of support, lack of knowledge about ASC; difficulties in managing ASC and parental involvement were important barriers to inclusion. Further, participants reported that individualising educational experiences, changing learning spaces, opportunities to learn about ASC and communication were important to improve support for autistic children.

The finding that early years staff had significantly greater knowledge of ASC may be an artefact of the increased funding that the Scottish Government has provided to early intervention (The Scottish Government 2010). These results provide an interesting contrast to that of Macleod and Perepa (2020) who found that early years staff working in an English education context had limited knowledge in relation to behaviours and traits that are common in ASC. Differences in ASC knowledge in staff working in different educational contexts may reflect macro-level factors which impact inclusion as argued by Barry et al. (2020).

Table 4. Themes representing participants' support suggestions.

Questionnaire: Do you have any suggestions on how to improve the service or support your role?		
Theme	Explanation	Example responses
Individualising educational experience	Staff suggested a more individualised approach to education. A more flexible curriculum, more counselling support and changes in teachers' expectations for autistic children were appropriate following the child's diagnosis.	<i>'More space in curriculum to meet children's needs.'</i> P80 PT <i>'More counselling support'</i> P97 ST <i>'Different expectations for children with ASC.'</i> P138 PSA
Changes to learning spaces	Staff described changes to the learning space that would facilitate learning and development for autistic children. Suggested changes included, smaller class sizes, increased ICT facilities, break out 'safe zones' for autistic children and more group work.	<i>'Safe zones for 'chill out' ...'</i> P96 ST <i>'More use of ICT.'</i> P1 ST <i>'More group work for young person with social situations ...'</i> P97 ST
Opportunities to learn about ASC	Staff made it clear that they needed more training about ASC. They wanted to be given more opportunities to observe practices in specialised ASC settings and to learn about the impact of ASC on education and emotional wellbeing.	<i>'more knowledge on strategies to enhance child's experiences, emotional and cognitive development.'</i> P55 EY <i>'Visits to observe strategies employed in specialised units'</i> P3 ST
Communication	There is a need for more quick and thorough communication among staff, including specialist practitioners, more experienced staff, management and families.	<i>'More help from experience staff.'</i> P39 PSA <i>'More communication with ASL [specialists], class teachers, management ...'</i> P127 PSA <i>'More quick and thorough communication'</i> P92 ST

EY = Early years practitioner, PT = Primary Teacher, ST Secondary Teacher, PSA = Pupil Support Assistant.

Interestingly, the qualitative data implied that all groups did not believe they had appropriate knowledge of ASC. This suggests that early years staff may lack confidence when asked what they know about ASC compared to when answering specific ASC knowledge questions. Such a finding is interesting given that it suggests that having knowledge of ASC is not enough for early years staff to feel confident in supporting autistic children. This is important as teachers' self-efficacy in relation to inclusive education has been shown to impact upon practice (e.g. Wilson, Woolfson, and Durkin 2018, 2019). Indeed, our qualitative findings identified limited self-efficacy as a barrier in successful inclusion. There is a need for research to focus on efficacy beliefs among early years staff as our findings suggest a deficit among this group.

Our results also showed that early years staff who had received training showed significantly greater knowledge about ASC than those who hadn't. Research has highlighted the importance of training (Leblanc, Richardson, and Burns 2009; Wilson, Woolfson, and Durkin 2019). Despite this, the qualitative data indicated that for all groups, participants reported a lack of training opportunities and felt under-supported to work effectively with autistic children. This supports previous work which has argued that most training courses for teachers do not include any formal ASC training (Dillenburger et al. 2014). Our findings also align with evidence suggesting that lack of teacher training impacts upon the success of inclusion (Dillenburger et al. 2016; Sharma et al. 2019; Shyman 2012; Silveira-Zaldivar and Curtis 2019). Our participants reported challenges in managing ASC and found it difficult to differentiate learning. The findings also suggest that staff were keen to learn from those trained specifically in ASC with training and communication from more experienced staff. It has been argued that feedback, support and interaction with other staff influence the formation of self-efficacy

(Bandura 2012; Pas, Bradshaw, and Hershfeldt 2012; Tschannen-Moran, Woolfolk Hoy, and Hoy 1998) thus highlighting the benefit of such opportunities. These suggestions are useful given that they would not require extensive funding and would work by allowing staff to feel more prepared in mainstream schools. Access to appropriate ASC support and training should act as an area of priority for local authorities and Government.

After early years staff, the findings showed that PSAs had better knowledge of ASC across domains 1–3 of the KCAHW than both the primary and secondary teaching staff, although differences were not significant. These domains specifically dealt with traits and behaviours of ASC and the results were perhaps a reflection of the time getting to know the children that the teaching staff do not get. One PSA respondent reflects on the lack of understanding that staff have about ASC and the difficulties that the children encounter. Such findings may reflect the fact that a key role of PSAs is supporting the development of positive behaviour (Groom 2006; Osborne and Reed 2011). PSA's are learning about the traits and difficulties on the job. PSA's provide one-to-one support and consistency for autistic children attending mainstream schooling (Farrell and Balshaw 2003). Yet, Toye, Wilson, and Wardle (2019) found despite their importance for educational inclusion, PSAs reported less knowledge and higher levels of other disorder-related stigma as compared with different professional groups.

Overall, class teachers (Primary and Secondary) scored lower than Early years staff and PSAs across all knowledge domains. Secondary teachers showed the poorest knowledge in the second and third domain and in their total knowledge on the KCAHW questionnaire. Humphrey and Symes (2013) found that secondary teachers had particular difficulty in understanding and dealing with rigid behaviours and communication problems, including non-verbal communication (i.e. inappropriate emotional displays). The lower knowledge scores in the current study may suggest that these behaviours are poorly understood by class teachers and in turn, find them harder to cope with. This is supported in the qualitative data where participants reflected a lack of understanding of what autism is and the difficulties that present. It could be postulated that these types of behaviours become more complex to understand as the child gets older, and what is more obvious and immediate in younger children, can be more convoluted in adolescence (i.e. challenging behaviours can be a consequence of burn-out, difficult interactions etc; Foggo and Webster 2017). Likewise, secondary teaching staff spend less class time with individual children and do not have the same knowledge of the autistic child. This is supported in the qualitative data which highlighted perceived difficulties for class teachers such as having to deliver the curriculum in a set way and being rigid with the timetable. Shevlin et al. (2009) also outlined the complexities of following the curriculum for inclusive education, particularly at secondary level. This is also reflected in the participants' suggested improvements. Participants reported a need for a more flexible, individualised approach to teaching and learning. Greater flexibility would allow a more tailored approach and perhaps help foster more positive relationships with autistic children and better school attainment (Venter, Lord, and Schopler 1992).

The study also examined the effect that experience of working with autistic children had on their knowledge of ASC more generally. Overall, no differences were found across any of the groups. Although some previous research supports the argument that years of teaching experience impact upon teacher beliefs and behaviour (e.g. Gal,

Schreur, and Engel-Yeger 2010), others have found no differences as a result of experience (Avramidis, Bayliss, and Burden 2000). Years' experience may not matter given that untrained, inexperienced staff work alongside more qualified staff and thus knowledge exchange is possible (Macleod and Perepa 2020). More research is needed to understand the role of years' experience. However, our qualitative data suggests that this knowledge exchange does not go far enough and that good communication from more experienced colleagues and ASC specialists is imperative. Relatedly it was also shown that autism training was not related to levels of knowledge across most of the occupations (except the early years group). This is surprising, given that typically training predicts knowledge (Mullens, Murnane, and Willett 1996), however, this may be reflective of the quality of education and training activities. Future research should explore the type of training (i.e. number of courses, Continuous Professional Development – CPD course, part of degree programme or college qualification etc.) and see whether this has an impact on levels of knowledge.

Mastery of experience was measured to examine whether staff believed they had successfully worked with autistic children in the past. This may in turn increase participants' knowledge of the condition. However, there were no significant relationships between knowledge scores and mastery of experience across groups. Thus, having a previous positive experience of working with an autistic child did not impact on knowledge. Previous work has shown that mastery experience is important to teacher engagement (Han et al. 2016) and self-efficacy (Tschannen-Moran and McMaster 2009; Wilson, Woolfson, and Durkin 2018). Our findings suggest that this cannot be extended to teacher knowledge. Mastery experience may impact upon psychological factors important to behaviour rather than predict understanding or knowledge. This has important implications for research examining the impact of teacher experience; it cannot be assumed that more experienced teachers have more knowledge of the particular neurodevelopmental condition.

Implications

The aim of the current study was to examine how the occupation, ASC experience and training of a range of school staff influenced ASC knowledge and mastery of experience, whilst also seeking staff views about perceived barriers and supports required for successful inclusion of autistic pupils.

Four themes of support emerged. These were (1) Individualising educational experience, (2) Changes to learning spaces, (3) Opportunities to learn about ASC and (4) Communication. Staff believe that in order to successfully include autistic children in mainstream education across all stages, it is important to incorporate these strategies. Exclusion rates of autistic children are consistently reported as being higher than other groups (e.g. Humphrey 2008; Munkhaugen et al. 2017; Totsika et al. 2020), therefore it is essential that staff are listened to. The themes found within the current study do not differ from what is already known about necessary support. Indeed Lindsay et al. (2014) reported similar themes that emerged from staff accounts of their support requirements including; communication between parents and pupils, tailored teaching methods and ASC specific resources and training amongst others, through conducting interviews with mainstream Canadian teachers. Similarly, a Zimbabwean study of primary school mainstream teachers identified several aspects that could improve inclusion including;

teacher training and stakeholder collaboration and institutionalisation of social support services and programmes (Majoko 2016). This reflects that the themes identified are found globally and more needs to be done to address them. Likewise, although the Scottish Strategy for Autism (Scottish Government 2010) has gone some way in improving provision, especially in the early years, more is still needed to be done across all sections of mainstream education.

Limitations

The current study has extended our understanding of the differences between different staff in mainstream education across different stages (early years, primary, secondary and PSAs). Such findings have important implications for teaching training and professional development. Despite this, we did not ask about child-specific knowledge. For example, the KCAHW questionnaire asks about comorbid conditions and developmental aspects of ASC, such as the onset of ASC, which may not be as important to a secondary teacher as it is to an early years practitioner. Another limitation of the current study is that these results are specific to Scotland and a result of the Scottish Government's Autism Strategy on inclusion and early intervention. As such, there are limitations as to the extent to which the findings can be generalised. However, as highlighted earlier, similar difficulties are highlighted worldwide (e.g. Lindsay et al. 2014; Majoko 2016). Uneven sample sizes between groups should also be considered when considering the current findings. There were substantially more PSA's and secondary school staff in the study than early years practitioners or primary school teachers, therefore differences between groups should be taken with caution. Despite these shortcomings, the current enquiry is one of the first studies to attempt to address how different groups of educators perceive barriers to inclusion. Due to the clear differences between groups reported here, future research needs to continue to explore different groups and types of educators rather than grouping them together and viewing them as one homogenous group.

Conclusion

This study was the first to examine knowledge of ASC in education practitioners from early years to secondary, including PSAs in Scotland. The results showed higher knowledge scores for early years staff, followed by PSAs, with primary and secondary teachers scoring more poorly. In addition, ASC specific training and previous ASC experience did not have an impact on knowledge scores. Lastly, mastery of experience was measured to examine whether staff believed they had successfully worked with children with ASC in the past and whether this related to their knowledge. No significant relationship was found and it is suggested that mastery of experience may relate more to psychological factors, rather than specific knowledge. Regardless of occupation, all school staff reported similar barriers to inclusion of ASC pupils which centred around knowledge, support, training, management of ASC feature and parent involvement. Likewise, participants all acknowledged similar strategies of support. This study not only extends the literature on educational practitioner knowledge of ASC but also informs practice since it highlights the need to address staff concerns over the barriers that still exist in the successful inclusion of children with autism in mainstream education.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix

Appendix 1

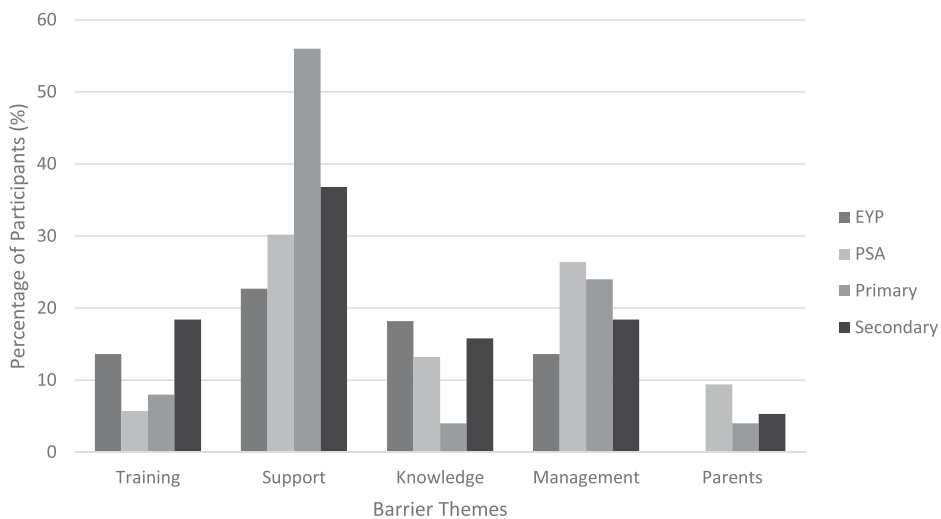


Figure A1. Perceived barriers: themes by participant group.

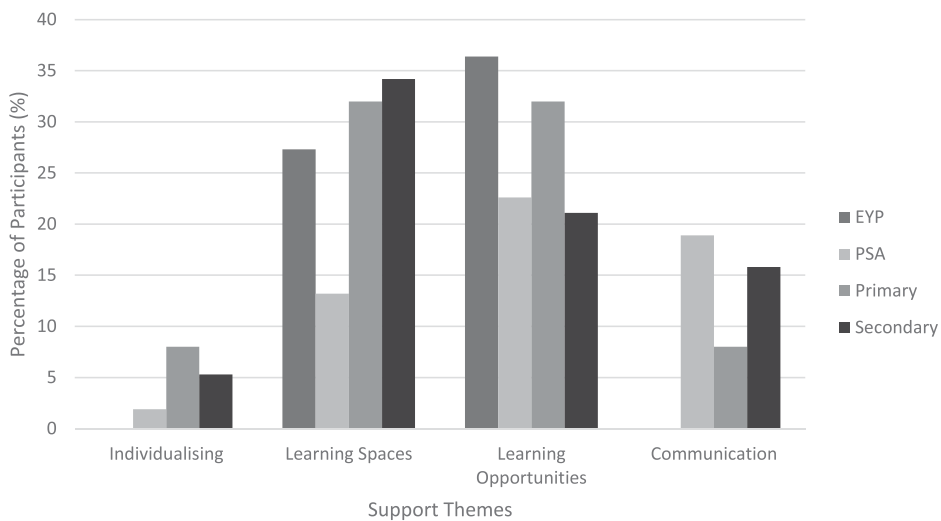


Figure A2. Suggestions for support by participant group.

Appendix 2