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Public Knowledge and Attitude towards Down Syndrome in Western Region, Saudi Arabia



Abstract: - Background: Down syndrome (DS) is an autosomal congenital disorder marked by a deficit in both general and mental development. It is the most frequent genetic cause of developmental intellectual impairment.

Objectives: The objectives of this study were to assess the public knowledge and attitude towards down syndrome in western region, Saudi Arabia.

Methods: A cross-sectional study conducted in western region at Saudi Arabia using an online questionnaire. Using random sample technique to choose five provinces. The questionnaire consists of demographic data, and questions related to knowledge and attitude towards down syndrome and it was used for data collection. Collected data was entered and analyzed using SPSS program.

Results: The majority of respondents fall within the age range of 20-30, accounting for 50.3% of the sample. 71.1% of the respondents are female, while 28.9% are male. 9.4% of participants had a family member with Down syndrome, while 90.6% did not. Most participants (73%) know that Down syndrome is a genetic disease. 81.1% of participants had good knowledge scores of down syndrome while 18.9% had poor knowledge. As for attitude, 95.1% of participants had positive attitude scores towards down syndrome while 4.9% had negative attitude.

Conclusion: The study shows good knowledge and positive attitude towards down syndrome in Saudi Arabia. Knowledge scores were significantly associated with age, gender, marital status and educational level; However, attitude scores were significantly affected with age, gender and marital status

Keywords: Down Syndrome, autosomal congenital disorder etc.

1. Introduction:

Down syndrome (DS) is an autosomal (non-sex chromosomal) congenital disorder marked by a deficit in both general and mental development also referred as trisomy 21, trisomy G, and mongolism [1]. Morphological traits include short stature, open mouth, epicanthal fold, hypotonia, loose ligaments, brachycephaly, and brachydactyly [2]. Down syndrome is caused by 3 cytogenetic variants, the commonest is Trisomy 21 which is an extra copy of chromosome 21 therefore it accounts for 98% of cases of Down syndrome. Then Translocation, which happens when parts of chromosome 21, connects to another chromosome, and mosaicism, which happens when some cells, but not all, contain an additional copy of chromosome 21, but they are less frequent [3]. It is the most frequent genetic cause of developmental intellectual impairment, occurring in 1 in 800 live births and resulting in an estimated 200,000–250,000 down syndrome patients in the US [4]. The incidence of Down syndrome (DS) is thought to be between 1 in 1000 and 1 in 1100 live births worldwide. In Saudi Arabia the prevalence of DS is 1 in 554 lives, which is comparatively higher than the global average [5]. Individuals with Down syndrome are more likely than the general population to experience structural birth abnormalities like Congenital heart defects (CHDs), cognitive impairment, immune system diseases, autoimmune issues, early aging, and Alzheimer's disease between the ages of 30 and 40 [6]. After the age of 40, the death rate for those with DS rises considerably. The primary reason for the increase in mortality among middle-aged persons with DS is the Alzheimer's disease-related decline in functional skills and rise in behavioral issues [7]. In a previous study done in Jeddah, SA showed that the general population has poor knowledge about Down syndrome [8]. According to a study, families with disabled children do not feel that social organizations (such as schools and intervention centers) are doing enough to support them. They also report feeling anxious and irritated about the lack of social

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support (services and individuals specialized and distinguished in practice). Consequently, they are dissatisfied with those services [9]. The 20-year survival rate in the United States of America (USA) is 88 percent for those born with down syndrome. The average lifespan for people with down syndrome has improved from 25 years in 1983 to nearly 60 years at this time, despite the fact that mortality rates during the first few years of life remain higher for those with down syndrome than for the general population [10]. A study conducted in Western Australia between 1983 and 2004 discovered that children with Down syndrome were hospitalized five times more frequently when compared to previously published general population data for the single year of 1995 [11]. Families of children with DS are more stressed because of constant difficulties. Studies comparing them to families of kids with other diseases, like autism and intellectual disabilities with unclear causes, however, reveal that they typically experience less stress and more rewards [12]. In view of the above our study has been undertaken to determine and assess the knowledge and attitude towards down syndrome in western region, Saudi Arabia. Identification and better understanding of the knowledge about down syndrome in the society will improve the quality of life in down syndrome patients.

2. Methods and Materials

Study design: This is a cross-sectional study conducted in western region at Saudi Arabia using a questionnaire created by the authors.

Study settings: Study conducted to measure public knowledge and attitude towards down syndrome among population from Makkah, Jeddah, Taif, Al-Madinah Al-Munawwarah, and Yanbu in western region at Saudi Arabia.

Subject: We used random sample technique to choose five provinces in western region of Saudi Arabia. The list of cities was acquired from (General Authority for Statics, Kingdom of Saudi Arabia). The provinces are Makkah, Jeddah, Taif, Al-Madinah Al-Munawwarah, and Yanbu.

Study population: Our study population was taken from the five provinces (Makkah, Jeddah, Taif, Al-Madinah Al-Munawwarah, and Yanbu). The sample size was estimated using the Raosoft sample size calculator, with a confidence level of 97%, and 3% margin of error. The minimum recommended sample size was 1308 and we gathered 2305.

Inclusion criteria: We have included certain criteria: western region residents, above 18 years old, both genders.

Exclusion criteria: We have excluded certain criteria: below 18 years old, non-residents of western region.

Data analysis: The “Microsoft Office Excel Software” software (2016) for Windows was used to enter data on the computer. The data was statistically analyzed using the Statistical Package of Social Science Software (SPSS) program, version 20 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp). Both descriptive and analytical statistics were employed. Chi square test was utilized to test the association between variables. P value considered significant if less than 0.05.

Method for data collection and instrument: Structured questionnaire was used to collect data for this study. The questionnaire was developed by the authors and tested for validity. This tool is being developed after consulting relevant studies conducted in Saudi Arabia and elsewhere, and it was reviewed by two pediatric consultant and a community medicine consultant. The final version of the questionnaire consists of three sections. The first section includes demographic questions (age, gender, marital status, nationality, education level, residency, family income, relatives with DS). The second part includes seven questions to assess the knowledge about down syndrome (DS) (diagnoses, causes, course, prognosis, risk factor, treatment, prevention). The last part includes seven questions about attitude towards DS (understanding, marriage, health services, education, employment, quality of life, support).

3. Results:

The data shows that the majority of respondents (50.3%) are 20-30 years old, with 17.4% under 20, 71.1% females, and 94.3% Saudi nationals. The majority hold a bachelor's degree, with 48.8% earning between 5,000-15,000 Saudi Riyals. The majority are single, with 34.5% married. The majority reside in Jeddah, followed by Taif.

Table (1): Sociodemographic characteristics of participants (n=2305)

Parameter		No.	%
Age	Less than 20	401	17.4
	20 - 30	1160	50.3
	31 - 40	298	12.9
	41 -50	282	12.2
	51 -60	137	5.9
	more than 60	27	1.2
Gender	Male	667	28.9
	Female	1638	71.1
Nationality	Saudi	2174	94.3
	Non-Saudi	131	5.7
Education Level	uneducated	3	.1
	primary	12	.5
	middle	45	2.0
	High school	574	24.9
	Bachelor's	1375	59.7
	diploma	193	8.4
	Master's	79	3.4
	Ph.D.	24	1.0
Monthly Family Income (in Saudi Riyals)	Less than 5,000	428	18.6
	5,000 - 15,000	1125	48.8
	Over 15,000	752	32.6
Marital Status	Married	795	34.5
	Single	1437	62.3
	Divorced	51	2.2
	Widowed	22	1.0
Residence	Taif	521	22.6
	AL Madinah AL Munawwarah	492	21.3
	Jeddah	597	25.9
	Makkah	395	17.1
	Yanbu	226	9.8
	Other than that	74	3.2

As illustrated in Figure 1 and Figure 2. 9.4% of participants had a family member with Down syndrome, while 90.6% did not. 39.4% of participants reported that pre-birth diagnosis can be done by genetic testing, 37.4% by morphological characteristics (ultrasound), and 23.2% did not know the method of diagnosis.

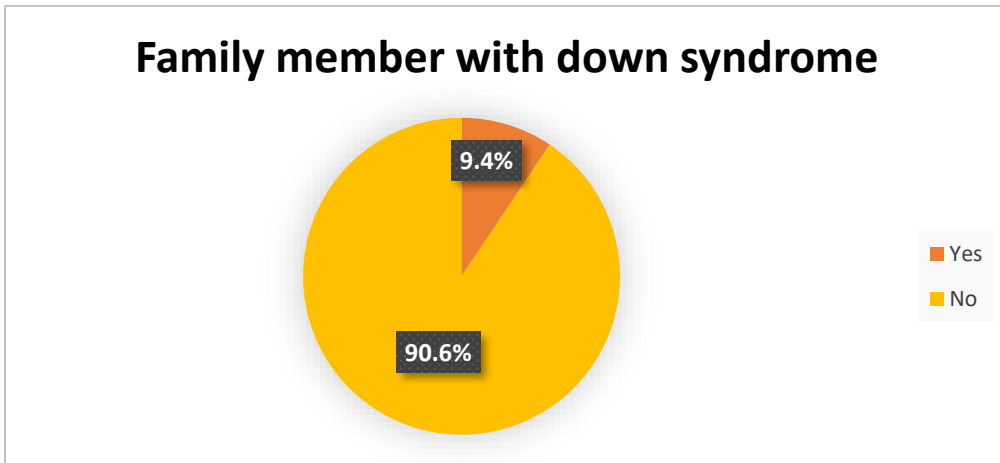


Figure (1): Prevalence of down syndrome among participants' family members

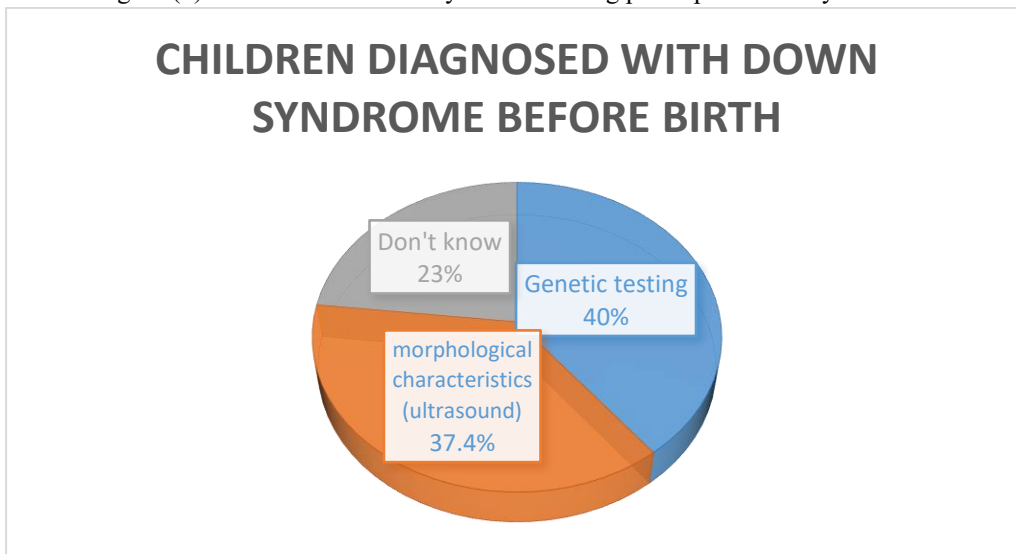


Figure (2): Participants' knowledge of diagnosis of down syndrome before birth

The survey revealed that 73% of participants know Down syndrome is a genetic disease, while 9.2% and 17.8% don't know. Most believe children with Down syndrome are born with the condition, while 2.5% and 7.2% don't know. Most participants agree that Down syndrome doesn't disappear when children grow up, but 1.8% don't. 87% understand that children with Down syndrome don't necessarily have siblings with the same syndrome, but 2.2% and 10.8% don't know. Many participants don't believe Down syndrome can be cured, but over half think it can be reduced. Over half of respondents believe the rate of Down syndrome can be reduced.

Table (2): Knowledge of participants of down syndrome (n=2305).

	Yes	No	Don't know
Down syndrome is a genetic disease	1682 73.0%	212 9.2%	411 17.8%
Children with Down syndrome are born with this syndrome	2082 90.3%	57 2.5%	166 7.2%
Down syndrome disappear when children with Down grow up	41 1.8%	2061 89.4%	203 8.8%
Children with Down syndrome have siblings with the same syndrome	50 2.2%	2005 87.0%	250 10.8%
Down syndrome be cured	190 8.2%	1500 65.1%	615 26.7%
The rate of Down syndrome can be reduced	1177 51.1%	220 9.5%	908 39.4%

As shown in Table 3, the overwhelming majority of respondents believe that children with Down syndrome can understand when spoken to, with 95.1% expressing this viewpoint. Similarly, the data indicates that a significant portion of respondents, 84.3%, believe that adults with Down syndrome can marry and have children. Furthermore, the survey reveals that an overwhelming majority, 93.4%, would recommend additional help or health services for individuals with Down syndrome or their parents. In the context of education, a substantial majority of respondents, 81.7%, would allow a child with Down syndrome to study at their public school if they were the principal. Similarly, in the realm of employment, 87.1% of respondents would consider giving a job to someone with Down syndrome if they were an employer. Lastly, an overwhelming majority of respondents, 95.2%, expressed a willingness to play a role in improving the quality of life of people with Down syndrome.

Table (3): Participants' attitude and practice towards down syndrome (n=2305).

	Yes	No
Is it possible for children with Down syndrome to understand when we talk to them?	2193 95.1%	112 4.9%
Can adults with Down syndrome get married and have children?	1944 84.3%	361 15.7%
Would you recommend people with Down syndrome or their parents for special help or health services?	2154 93.4%	151 6.6%
If you are the principal of a public school, and a child with Down syndrome wants to study at your school, will you allow them to do so?	1883 81.7%	422 18.3%
If you are an employer and someone with Down syndrome wants to get a job, would you consider giving them a job?	2007 87.1%	298 12.9%
Would you like to play a role in improving the quality of life of people with Down syndrome?	2194 95.2%	111 4.8%
Will you support the Down syndrome people in living a normal life	2265 98.3%	40 1.7%

The study found a significant association between age, marital status, gender, nationality, education level, residence, and annual income in Saudi Arabia. Respondents aged 20-30 had the highest percentage of "Yes" responses (39.7%), while those over 60 had the lowest (0.8%). Marital status also showed a significant association, with single individuals having the highest percentage (49.4%). Gender did not reveal a significant association, but females had a higher portion of "Yes" responses (52.1%) compared to males (20.9%). Nationality did not show a significant association, but most respondents were Saudi nationals (69.0%). Education level was also significant, with respondents with a Bachelor's degree having the highest percentage (44.9%). The residence also showed a significant association, with respondents from Taif having the highest percentage (17.2%) and those from AL Madinah AL Munawwarah having the second highest percentage (15.7%). Annual income also showed a significant association, with respondents with an annual income of 5,000-15,000 Saudi Riyals having the highest percentage (35.6%).

As illustrated in figure (3), 81.1% of participants had good knowledge scores of down syndrome while 18.9% had poor knowledge.

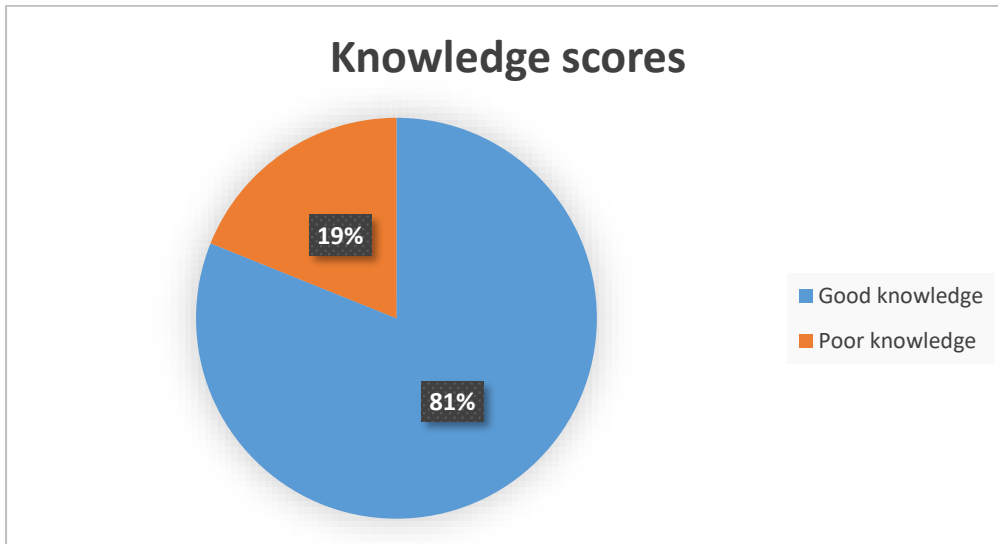


Figure (3): Participants' knowledge scores of down syndrome

As illustrated in figure (4), 95.1% of participants had positive attitude scores towards down syndrome while 4.9% had negative attitude.

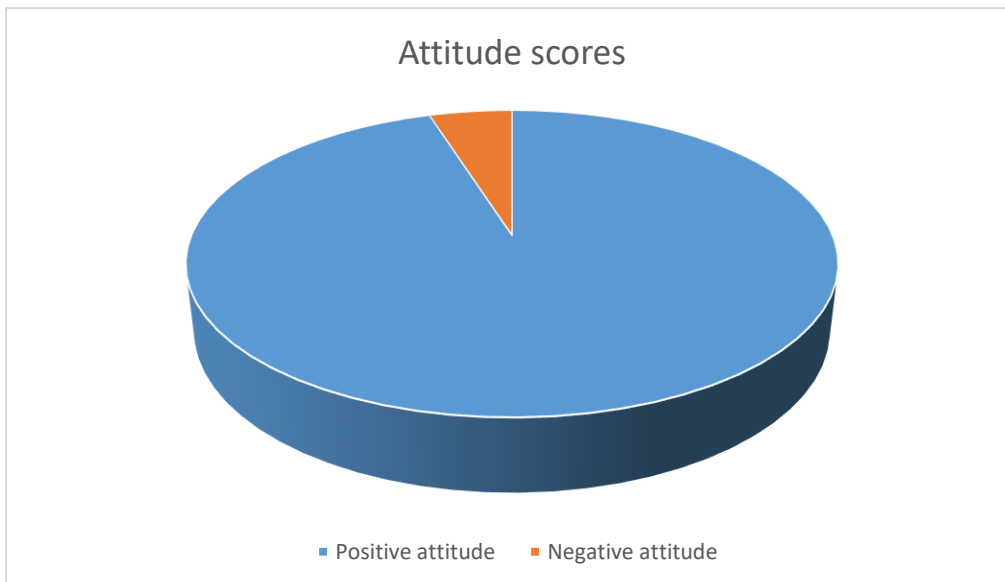


Figure (4): Participants' attitude scores of down syndrome

As in Table (4), it is evident that there is a statistically significant association between age and knowledge score (P value = 0.001). The data indicates that individuals in the 20-30 age group have the highest proportion of good knowledge (42.6%) compared to other age groups. In contrast, those over 60 have the lowest percentage of good knowledge (1.0%). The data also reveals a significant association with knowledge score (P value = 0.001) regarding marital status. Single individuals exhibit the highest proportion of good knowledge (52.8%), whereas widows have the lowest proportion of good knowledge (0.7%). The gender breakdown shows that there is a statistically significant association between gender and knowledge score (P value = 0.002), with females having a higher proportion of good knowledge (58.8%) compared to males (22.3%). When considering nationality, there is no statistically significant association with knowledge score (P value = 0.225), although Saudi nationals have a notably higher proportion of good knowledge (76.7%) compared to non-Saudis (4.4%). Education level demonstrates a clear association with knowledge score (P value = 0.001), as individuals with a Ph.D. exhibit the highest proportion of good knowledge (49.5%). In comparison, uneducated individuals have the lowest percentage of good knowledge (0.1%). Moving on to residence, no statistically significant association exists with knowledge score (P value = 0.313). However, individuals residing in Jeddah have the highest proportion of good knowledge (21.0%), while those in Yanbu have the lowest (7.7%). Finally, the data shows a significant association between

monthly income and knowledge score (P value = 0.001), with individuals earning over 80,000 Saudi Riyals having the highest proportion of good knowledge (27.7%) and those making less than 5,000 Saudi Riyals having the lowest proportion of good knowledge (13.3%).

Table (4): Knowledge scores of participants in association with their sociodemographic characters (n= 2305)

		Knowledge score		Total (N=2305)	P value
		Good knowledge	Poor knowledge		
Age	than 20	333	68	401	0.001
		14.4%	3.0%	17.4%	
	20 - 30	983	177	1160	
		42.6%	7.7%	50.3%	
	31 - 40	222	76	298	
		9.6%	3.3%	12.9%	
	41 - 50	213	69	282	
		9.2%	3.0%	12.2%	
51 - 60	96	41	137		
	4.2%	1.8%	5.9%		
more than 60	23	4	27		
	1.0%	0.2%	1.2%		
marital status	Single	1217	220	1437	0.001
		52.8%	9.5%	62.3%	
	Married	597	198	795	
		25.9%	8.6%	34.5%	
	Divorced	39	12	51	
		1.7%	0.5%	2.2%	
widow	17	5	22		
	0.7%	0.2%	1.0%		
Gender	Male	515	152	667	0.002
		22.3%	6.6%	28.9%	
	Female	1355	283	1638	
		58.8%	12.3%	71.1%	
Nationality	Saudi	1769	405	2174	0.225
		76.7%	17.6%	94.3%	
	Non-Saudi	101	30	131	
		4.4%	1.3%	5.7%	
Education Level	uneducated	2	1	3	0.001
		0.1%	0.0%	0.1%	
	primary	10	2	12	
		0.4%	0.1%	0.5%	
	Preparatory	30	15	45	
		1.3%	0.7%	2.0%	
	Secondary	467	107	574	
		20.3%	4.6%	24.9%	
	Bachelor's	1141	234	1375	
		49.5%	10.2%	59.7%	
	Diploma	135	58	193	
		5.9%	2.5%	8.4%	
	Master's	63	16	79	
		2.7%	0.7%	3.4%	
Ph.D	22	2	24		
	1.0%	0.1%	1.0%		
Residence		426	95	521	0.313

	Taif	18.5%	4.1%	22.6%	
	AL Madinah	390	102	492	
	AL Munawwarah	16.9%	4.4%	21.3%	
	Jeddah	485	112	597	
	Makkah	21.0%	4.9%	25.9%	
		334	61	395	
		14.5%	2.6%	17.1%	
	Yanbu	178	48	226	
		7.7%	2.1%	9.8%	
	Others	57	17	74	
		2.5%	0.7%	3.2%	
Monthly Income (in Saudi Riyals)	Less than 5,000	306	122	428	0.001
		13.3%	5.3%	18.6%	
	5,000 - 15,000	925	200	1125	
		40.1%	8.7%	48.8%	
	Over 80,000	639	113	752	
		27.7%	4.9%	32.6%	

Table (5) reveals that individuals aged 20-30 represent the largest proportion of the sample (50.3%), followed by those aged 31-40 (12.9%) and 41-50 (12.2%). Notably, the youngest age group (<20) exhibits a relatively high percentage of individuals with a poor attitude (0.7%), while the older age groups show progressively lower percentages of poor attitudes. Moving on to marital status, the majority of respondents are single (62.3%), followed by married individuals (34.5%). The data also indicates that a small proportion of divorced (2.2%) and widowed (1.0%) individuals are included in the sample, with varying percentages of poor attitudes within each subgroup. Gender-wise, the majority of respondents are female (71.1%), compared to male respondents (28.9%). The data suggests that a higher percentage of males exhibit a poor attitude (2.4%) compared to females (2.5%). Nationality is another significant factor, with the vast majority of respondents being Saudi (94.3%). Non-Saudi individuals represent a smaller proportion (5.7%), with relatively lower percentages of poor attitudes within both groups. Education level demonstrates a varied distribution, with a majority of respondents holding a bachelor's degree (59.7%) followed by secondary education (24.9%) and diploma holders (8.4%). The data also indicates that individuals with a Ph.D. exhibit the lowest percentage of poor attitudes(0.0%). Residence-wise, the data showcases the distribution of respondents across different locations, with Jeddah (25.9%) and Taif (22.6%) having the highest percentages of poor attitudes. Conversely, Makkah and Yanbu exhibit relatively lower percentages of poor attitudes. Finally, the data includes information on monthly income, revealing that individuals earning between 5,000 and 15,000 Saudi Riyals constitute the largest group (48.8%), followed by those earning over 80,000 Riyals (32.6%). Interestingly, the lowest percentage of poor attitudes is observed in the highest-income group.

Table (5): Attitude scores of participants in association with their sociodemographic characters (n= 2305)

		Attitude score		Total (N=2305)	P value
		Good attitude	Poor attitude		
Age	than 20	384	17	401	0.017
		16.7%	0.7%	17.4%	
	20 - 30	1113	47	1160	
		48.3%	2.0%	50.3%	
	31 - 40	281	17	298	
		12.2%	0.7%	12.9%	
	41 - 50	266	16	282	
		11.5%	0.7%	12.2%	
	51 - 60	122	15	137	
		5.3%	0.7%	5.9%	
	more than 60	26	1	27	
		1.1%	0.0%	1.2%	
	Single	1376	61	1437	0.030

marital status		59.7%	2.6%	62.3%	
	Married	749	46	795	
		32.5%	2.0%	34.5%	
	Divorced	45	6	51	
		2.0%	0.3%	2.2%	
widow		22	0	22	
		1.0%	0.0%	1.0%	
Gender	Male	612	55	667	0.001
		26.6%	2.4%	28.9%	
	Female	1580	58	1638	
		68.5%	2.5%	71.1%	
Nationality	Saudi	2070	104	2174	0.283
		89.8%	4.5%	94.3%	
	Non-Saudi	122	9	131	
		5.3%	0.4%	5.7%	
Education Level	uneducated	3	0	3	0.773
		0.1%	0.0%	0.1%	
	primary	11	1	12	
		0.5%	0.0%	0.5%	
	Preparatory	44	1	45	
		1.9%	0.0%	2.0%	
	Secondary	544	30	574	
		23.6%	1.3%	24.9%	
	Bachelor's	1313	62	1375	
		57.0%	2.7%	59.7%	
	Diploma	179	14	193	
		7.8%	0.6%	8.4%	
	Master's	75	4	79	
3.3%		0.2%	3.4%		
Ph.D	23	1	24		
	1.0%	0.0%	1.0%		
Residence	Taif	492	29	521	0.121
		21.3%	1.3%	22.6%	
	AL Madinah AL Munawwarah	460	32	492	
		20.0%	1.4%	21.3%	
	Jeddah	576	21	597	
		25.0%	0.9%	25.9%	
	Makkah	382	13	395	
		16.6%	0.6%	17.1%	
	Yanbu	212	14	226	
		9.2%	0.6%	9.8%	
Others	70	4	74		
	3.0%	0.2%	3.2%		
Monthly Income (in Saudi Riyals)	Less than 5,000	407	21	428	0.155
		17.7%	0.9%	18.6%	
	5,000 - 15,000	1061	64	1125	
		46.0%	2.8%	48.8%	
	Over 15,000	724	28	752	
		31.4%	1.2%	32.6%	

4. Discussion:

Public knowledge and attitude towards Down syndrome in Saudi Arabia has been an area of concern and interest in recent years. It is important to understand how the general public in Saudi Arabia perceives and understands this condition, as it can greatly impact the lives of individuals with Down syndrome and their families. [2, 7].

According to our study results, participants exhibited good knowledge of Down Syndrome. Several studies have assessed public awareness and knowledge of Down syndrome among different populations and groups. For example, Deakin (2014) investigated the perceptions of children and young people with Down syndrome, their non-disabled peers and mothers, using pictorial methods to overcome the limitations of verbal methods [13]. A study in Sri Lanka found that the overall knowledge of Down syndrome screening among antenatal patients was poor and suggested that more information and counseling should be provided to them [14]. Another study in Malaysia explored the knowledge, awareness and perception of genetic testing for hereditary disorders, including Down syndrome, among the general public, and reported a low level of awareness and understanding [15]. One notable study conducted by Smith et al. (2018) aimed to assess public awareness of Down syndrome in a diverse sample of individuals. The researchers found that the majority of participants had a basic understanding of Down syndrome as a genetic disorder caused by the presence of an extra copy of chromosome 21 [16]. Another study focused on the awareness of Down syndrome among healthcare professionals highlighted a concerning lack of knowledge and misconceptions among this group, which is especially alarming considering their role in providing accurate information and support to families affected by Down syndrome [17].

As for attitude, our study shows good attitudes from participants towards Down syndrome. A study was conducted to examine public attitudes towards individuals with Down syndrome. The findings indicated that while there was generally a positive perception of people with Down syndrome, there were still prevalent stereotypes and misconceptions that needed to be addressed. The study underlined the importance of challenging these stereotypes and promoting the inclusion and acceptance of individuals with Down syndrome within society [18]. According to Seewooruttun et al. [19], the general public's attitude is poor, but certain activities, including educational interventions, can raise awareness levels. These treatments showed the most significant impact on awareness levels. Despite the fact that Coles et al. demonstrated that people in both regions' general public had good attitudes towards patients with Down syndrome, a significant number of people expressed reservations about caring for these patients [20].

The attitude towards individuals with Down syndrome has also evolved. In the past, they were often marginalized and excluded from mainstream society. However, with increased knowledge and awareness, there has been a shift towards inclusion and acceptance [18].

The lack of accurate and accessible information about Down syndrome in Saudi Arabia is a significant challenge in improving public knowledge. Misconceptions and stereotypes often stem from outdated or incorrect sources, necessitating comprehensive educational campaigns and initiatives [20]. Organizations and advocacy groups are working to raise awareness and understanding of the condition, its effects, and the potential of individuals with Down syndrome [8]. Education plays a crucial role in changing attitudes towards Down syndrome and promoting inclusive learning environments and resources for individuals with Down syndrome [4]. Awareness campaigns, advocacy groups, and support organizations have also played a significant role in fostering a more positive attitude toward Down syndrome, challenging societal norms and stereotypes, and fostering greater understanding and acceptance within the community [6].

5. Conclusion:

The study shows good knowledge and a positive attitude towards Down syndrome in Saudi Arabia. Knowledge scores were significantly associated with age, gender, marital status, and educational level. However, attitude scores were significantly affected by age, gender, and marital status.

Ongoing efforts are needed to ensure accurate information is accessible and address cultural beliefs that may hinder acceptance and inclusion. Advancements in medical research and inclusive educational practices have contributed to a positive perception of Down syndrome. Further efforts are needed to promote inclusion, acceptance, and equal opportunities for individuals with Down syndrome, ensuring they can lead fulfilling lives.

Additional Information

Disclosures Human subjects: Consent was obtained or waived by all participants in this study. National Committee for Bioethics issued approval HAO-02-T-105. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform

disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work. Acknowledgements The authors gratefully acknowledge the cooperation of all study participants

Funding: None

Conflicts of interest: no conflicts related to this work

Consent for publication: Informed consent was obtained from all the participants

Ethical considerations: The research ethics committee of Taif University, Saudi Arabia granted its clearance for the current work.

Acknowledgments: The authors gratefully acknowledge the cooperation of all study participants.

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