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Article

Health Literacy of COVID-19 and Compliance with Precautionary Measures: A Cross-Sectional Study in Adolescents and Young Adults in Ireland

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Abstract: The COVID-19 pandemic has been associated with an ‘infodemic’, and young people have reported difficulties dealing with COVID-19-related information. The present cross-sectional study aimed to explore health knowledge related to COVID-19 and accessing relevant information as aspects of health literacy in a cohort of adolescents and young adults residing in Ireland. It also aimed to explore COVID-19-related concerns and levels of compliance with precautionary measures. Data were collected from young people ($n = 1009$) aged 12–25 years old through an online anonymous survey. Our findings highlight that young people possessed sufficient knowledge about COVID-19 transmission routes and adhered to most precautionary measures. Young people believed that they were moderately likely to contract COVID-19 and highly likely to survive COVID-19 should they get infected. However, these patterns seemed to differ between adolescents and young adults as well as between participants living with and without a chronic health condition (CHC). These findings have implications that can inform knowledge on youth health literacy and health-related attitudes that go beyond the COVID-19 pandemic. Contextual factors such as country context, age group, gender, and the absence or presence of a CHC are important characteristics to consider when designing public health awareness campaigns targeting a global health crisis.

Keywords: health literacy; adolescents; young adults; pandemic; COVID-19; worry; compliance; precautionary measures; health information; beliefs



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1. Introduction

1.1. COVID-19 in Ireland

The novel coronavirus (COVID-19) is an infectious disease that was first identified in December 2019 in Wuhan, China [1] and was declared a global pandemic on 11 March 2020 by the World Health Organisation (WHO). To tackle the spread, many countries imposed social distancing measures, movement restrictions, and lockdowns. By March 2020, restrictions were in place in the Republic of Ireland, including stay-at-home orders (except for essential workers, shopping, medicines, exercise, and care for relatives), bans on public and private gatherings, and closures of non-essential shops, community centers, bars, and restaurants. Since March 2020, Ireland has experienced three lockdowns, with the third (January–May 2021) placing the country very high on the list of the COVID-19 Containment and Health Index. This index is calculated on the basis of response metrics such as school closures, travel bans, restrictions of internal movements, and workplace closures [2].

1.2. COVID-19 and Young People

Although young people are at a low risk for hospitalisation and death from COVID-19 compared with other age groups [3], the virus can affect other aspects of their physical, mental, and social health. COVID-19 has interrupted normative aspects of youth development, marking adolescence and young adulthood, periods usually characterised by mounting independence and placing importance on peer relationships [4,5]. However, in the light of COVID-19, many young people have been faced with increased parental monitoring, less privacy and independence, and fewer peer interactions [6]. Particular concern arises regarding school closures. Chaabane and Doraiswamy [7] suggested that school closures and home quarantine may contribute to loneliness and anxiety in children and adolescents and have negative effects on sleep patterns and quality.

For young adults, university closures and financial concerns have resulted in many returning to family households after a period of independence. Furthermore, social and economic shifts have disrupted romantic and sexual relationships and access to confidential, affordable health care services [6]. Regarding job prospects and future planning, COVID-19 has created major uncertainty. The Economic and Social Research Institute suggests that COVID-19 has disproportionately affected young people in Ireland in terms of job losses [8]. A study of recent college graduates in Ireland found that most people had abandoned plans of travelling after college, and some were feeling ‘ill-equipped and discouraged’ to start job searching [9].

1.3. Health Literacy of COVID-19

Health literacy encompasses health-related components such as health knowledge, access to health information, health behaviours, as well as access to and engagement with health services and providers. Young people perceive health literacy as a construct mostly related to accessing, obtaining, and using health knowledge to inform health-related decisions and behaviours. Positive relationships between health literacy and engaging in preventive behaviours as well as possessing sufficient health knowledge and information facilitates young people’s engagement with health actions [10].

COVID-19 is the first pandemic in history where technology has been used to keep the public safe, informed, and connected [11]. Common media sources employed by young adults for COVID-19 information include the Internet and applications such as Instagram and WhatsApp [12]. Although young people may have adequate COVID-19-related health literacy [13], many report difficulties dealing with COVID-19 information [14]. For example, a study from Indonesia by Halim and Kurniawan [15] explored knowledge and understanding of COVID-19 during the first outbreak in young people aged 10–25 years old. Most participants showed an understanding of how the virus spread and of its symptoms. However, over half indicated that COVID-19 was caused by a ‘non-virus’, and few had knowledge of preventative public health measures.

Although limited, the available evidence on youth health literacy of COVID-19 seems to vary according to the country context. For example, a study in adolescents from the US showed that over 70% could identify three symptoms of infection, and 87% reported they were ‘staying at home as much as possible’ and ‘washing their hands with soap more frequently’ as well as demonstrating good knowledge of what social distancing required [16]. In a study from Syria, young people aged 16–29 years old reported moderate COVID-19 knowledge [17]. Age seems to be another differentiating factor regarding knowledge of COVID-19, and yet again, there are discrepancies in the existing evidence. For instance, in a cohort of young adults aged 22–32 years old from Nigeria, increasing age was associated with increasing knowledge of COVID-19 [18]. However, in another study from Bangladesh, the younger group of participants (12–20 years old) showed more accurate knowledge than the older groups [19]. Because evidence of youth health literacy related to COVID-19 is still quite limited in Ireland, with the existing evidence suggesting that the country context and age should be accounted for as differentiating factors, it is important to obtain diverse contextual knowledge on youth cohorts.

1.4. Precautionary Measures

Evidence shows that adolescents and young adults had the lowest compliance with COVID-19-related public health measures, particularly with social distancing [20,21]. These cohorts may be asymptomatic or show mild symptoms while having COVID-19 [22]. Because young people tend to have wide social networks and be quite active socially, they may carry a high likelihood to spread COVID-19 amongst their social groups [20,23,24]. Evidence from the swine flu pandemic in 2009 suggested that individuals who perceived a higher risk of contracting the virus and perceived health-related information disseminated by the government as trustworthy were more likely to comply with precautionary measures [25]. In a study from Switzerland during the first COVID-19 lockdown, young adults reported high compliance with social distancing guidelines, despite perceiving low personal risk [26]. However, another study from Switzerland suggested that young people were compliant with only 2–3 public health measures (out of 13) [27]. Non-compliance with hygiene measures was more frequently reported than non-compliance with social distancing measures, especially by males.

Although gender differences have been reported in young people's health literacy, adherence to precautionary measures, and in other health related aspects of COVID-19, there is a lack of consensus in the available evidence. For example, in a US study, female adolescents were more likely to engage in protective measures such as improved hygiene measures, social distancing, and activity restriction than males [28]. A different pattern of gender differences was reported by a study conducted in India, suggesting that young females were less knowledgeable of COVID-19 health information and were less likely to adhere to preventive measures than males [29]. Another study reported no gender differences in satisfaction with health information, but adolescent females were more concerned about contracting COVID-19 than adolescent males [30]. These contradictory findings suggest that obtaining more evidence on gender differences will add to our knowledge of young people's responses to COVID-19.

Individuals with underlying chronic health conditions (CHCs) are more likely to develop more severe COVID-19 illness, which can lead to death [31]. They may also face harsher mental and psychosocial impacts from COVID-19 [32,33]. With many health services still temporarily halted, operating at reduced capacity, or moving online due to COVID-19 restrictions, the daily routines and treatments of patients with long-term conditions have been disrupted. In a study investigating lockdown effects on patients with chronic conditions, 98% reported that a lockdown had affected their routine living, and 45% reported that it affected their health [34]. Because individuals with CHCs can be more susceptible to getting seriously ill from COVID-19, they may also be more likely to show greater levels of compliance to precautionary measures (e.g., [35,36]).

1.5. The Present Study

Young people are not considered a high-risk cohort for experiencing severe consequences as a result of COVID-19. However, COVID-19 can impact their social and emotional wellbeing, while young people living with chronic underlying health conditions are at high risk of developing a severe COVID-19 case. COVID-19 has been associated with an 'infodemic' [11], and young people have reported difficulties dealing with COVID-19 information [14]. Knowledge of and compliance with public health guidelines and precautionary measures are important for protecting personal and public health. This is an important realisation considering that, despite the successful vaccination roll-out in several countries, the pandemic is still ongoing, and it may take some time before it will be officially declared as over. To date, there is limited evidence on young people's knowledge about COVID-19 and even less evidence differentiating between two distinct age cohorts. Hence, the present study aimed to explore health knowledge related to COVID-19 as well as access relevant information such as aspects of health literacy. It also aimed to explore COVID-19-related concerns and levels of compliance with precautionary measures in a cohort of adolescents and young adults residing in Ireland. Through collecting data from a sample spanning two

age cohorts—living with and without CHC—the present study aimed to offer a unique insight by identifying the potential differences in health literacy of COVID-19 as well as in other included variables.

2. Materials and Methods

2.1. Participants

The participants were young people ($n = 1009$) aged 12–25 years old ($M = 19.2$ years; $SD = 3.16$) recruited from the Republic of Ireland. The sample included 268 adolescents (27%) aged 12–17 years old ($M = 15.3$ years, $SD = 1.50$) and 741 young adults aged 18–25 years old ($M = 20.6$ years, $SD = 2.31$). Over half of the participants (52%) were enrolled in third-level education institutions at the time of data collection, 34% were secondary school students, and 11% reported being employed. Most participants identified as Irish (81%) and as females (79%). Most participants self-reported the absence of a CHC diagnosis (77%). Table 1 presents the detailed demographic profile of the study sample.

Table 1. Demographic characteristics and frequency of self-reported chronic health condition diagnosis.

Characteristic	<i>n</i> (%)	
Gender ($n = 1009$)	Male	193 (19.1)
	Female	801 (79.4)
	Do not identify as either of the above	15 (1.5)
Ethnic Background ($n = 1009$)	Irish	813 (80.6)
	Irish Traveller	1 (0.1)
	Any Other White Background	85 (8.4)
	Black or Black Irish	30 (3.0)
	Any Other Black Background	7 (0.7)
	Asian or Asian Irish	25 (2.5)
	Any Other Asian Background	10 (1.0)
	Other, Including Mixed Background	38 (3.8)
Education ($n = 1009$)	Secondary School (Junior Cycle)	111 (11.0)
	Secondary School (Senior Cycle)	229 (22.7)
	College of Further Education	229 (22.7)
	University Student: Bachelor	246 (24.4)
	University Student: Master or PhD	45 (4.5)
	Employed	110 (10.9)
Chronic Health Conditions ($n = 1009$)	Other	39 (3.9)
	No	774 (76.7)
	Yes	235 (23.3)
	Anxiety Disorders	122 (51.9)
	Depression	97 (41.3)
	Asthma	43 (18.3)
	Epilepsy	19 (8.1)
	Chronic Pain	19 (8.1)
	Attention Deficit Hyperactivity Disorder	17 (7.2)
	Autoimmune Diseases	16 (6.8)
	Arthritis	15 (6.4)
	Learning Disability	14 (6.0)
	Obesity	10 (4.3)
	Anorexia Nervosa	8 (3.4)
	Autism	8 (3.4)
	Diabetes	8 (3.4)
	Bulimia Nervosa	7 (3.0)
	Bipolar Affective Disorders	7 (3.0)
	Physical Disability	6 (2.6)
	Sensory Disability	5 (2.1)
Cancer	2 (0.9)	
Heart Diseases	2 (0.9)	
HIV or AIDS	1 (0.4)	
Other	59 (25.1)	

2.2. Measures

2.2.1. Physical Health Status and COVID-19 Contact History

To measure the physical health status and contact history, we used individual items from Wang and Pan [37]. The participants were asked to rate their current health status on a 5-point Likert scale (responses ranged from 1 = very poor to 5 = very good). They were also asked whether they had been diagnosed with chronic health conditions (physical, mental, or both) by a health or mental health professional. Regarding COVID-19 contact history, the participants were asked whether (since January 2020) they had been tested for or diagnosed with COVID-19, whether they had been instructed to self-isolate or be under quarantine, and whether a family member living in the same home had been tested for or diagnosed with COVID-19 or instructed to self-isolate.

2.2.2. Health Literacy and Concerns about COVID-19

Health literacy about COVID-19 was measured using individual items informed by the study of Wang et al. [37]. These items aimed to capture young people's knowledge regarding routes of transmission (i.e., via contaminated objects, droplets, and airborne) as well as their satisfaction with health information about COVID-19. Specifically, three dichotomous items (agree or disagree response options) were used to ask participants about COVID-19 transmission routes (i.e., droplets, airborne, or contaminated objects). An example item is 'You can catch COVID-19 through . . . contaminated objects'. Regarding concerns related to COVID-19, the participants were asked to rate on a 4-point Likert scale how likely they believed they were to contract COVID-19, how likely they would be to survive if they contracted COVID-19 (responses ranged from 1 = not likely at all to 4 = very likely), and how worried they were about a family member getting COVID-19 (from 1 = not worried at all to 4 = very worried). Higher scores indicated higher levels of the respective variables. The participants were asked to indicate their main source of COVID-19 information (e.g., Internet or social media, TV, friends, and family). Finally, one item asked the participants to rate on a 5-point Likert scale how satisfied they were with the available health information on COVID-19, with higher scores indicating higher levels of satisfaction.

2.2.3. Precautionary Measures

Individual items [37] were employed to capture engagement with precautionary measures against COVID-19 by young people. These included the following: covering your mouth when coughing or sneezing, avoiding sharing utensils, washing hands with soap and water, washing hands immediately after coughing, rubbing the nose or sneezing, wearing a mask regardless of the presence or absence of symptoms, and staying at home because of concerns about catching COVID-19. Responses ranged from 1 = never to 5 = always. The participants were also asked whether they felt too much fuss or unnecessary worry had been made about COVID-19 (1 = strongly disagree, 5 = strongly agree). Higher scores on these items indicated higher levels of the respective variables.

2.3. Procedure

The survey questionnaire was finalised upon consultation with the youth advisory panel associated with this research (Cross Care Youth Services of Dún Laoghaire). Data for this quantitative cross-sectional study were collected online from October 2020 to May 2021 through the Qualtrics survey platform, mainly by using purposive sampling. The anonymous self-report survey was advertised via different channels and networks, including social media platforms. Young people residing in Ireland aged 12–25 years old were eligible to participate. The estimated duration of the survey was approximately 20–30 min. The young people were not offered any incentives to participate in the study. Informed consent was obtained from all adult participants aged 18–25 years old. Secondary school students (12–17 years old) were recruited online through schools, with the principal or guidance counsellor acting as gatekeepers and sharing the study information with parents. Secondary schools were randomly selected to represent all country areas from the list

obtained by the Department of Education in Ireland. For participants aged 12–17 years old, consent from a parent or guardian was initially obtained, which was followed by informed assent from the child.

2.4. Data Analysis

Descriptive statistics were calculated for all study variables. Chi-square tests and one-way analysis of variance (ANOVA) were used to examine the differences accounted for by age group (12–17 years and 18–25 years) and the presence or absence of a self-reported CHC diagnosis. All tests were two-tailed with significance levels of $p < 0.05$. Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 26 [38].

3. Results

As shown in Table 1, 23% of the participants self-reported being diagnosed with a chronic health condition. Of those, approximately 49% reported that this was a mental condition, 31% reported a physical condition, and 20% reported a comorbid diagnosis of both physical and mental conditions.

3.1. Health Status and COVID-19-Related History

Regarding overall health at the time of completing the survey, approximately 39% of the respondents reported they were in very good health, 39% were in good health, 17% were in fair health, 3% were in poor health, and 2% were in very poor health (see Table 2). There were no significant differences between adolescents ($M = 4.15$, $SD = 0.91$) and young adults ($M = 4.08$, $SD = 0.89$) regarding their health status ($F(1, 996) = 1.26$, $p = 0.28$). Overall, 22% ($n = 219$) of the participants had been tested for COVID-19 since January 2020, and of those, 10% (21) reported being diagnosed with COVID-19. Only two participants reported being treated at a hospital. Of the total sample, 33% (336) of the participants reported that they had been instructed to self-isolate or be under quarantine (see Table 2).

Table 2. Descriptives for health status and personal and family COVID-19 history.

Variable		<i>n</i> (%)	<i>M</i> (<i>SD</i>)
Health Status ($n = 998$)	Very Good	382 (38.9)	4.10 (0.90)
	Good	395 (39.1)	
	Fair	176 (17.4)	
	Poor	30 (3.0)	
	Very Poor	15 (1.5)	
COVID-19-Related History			
Tested for COVID-19 ($n = 1004$)	Yes	218 (21.6)	
	No	786 (77.9)	
(If Tested) Diagnosed with COVID-19 ($n = 218$)	Yes	21 (9.6)	
	No	197 (90.4)	
Treated at a Hospital ($n = 21$)	Yes	2 (9.1)	
	No	19 (90.9)	
Instructed to Self-Isolate Quarantine ($n = 1009$)	Yes	336 (33.3)	
	No	666 (66.0)	
Family COVID-19-Related History			
Family Member Tested for COVID-19 ($n = 993$)	Yes	387 (38.4)	
	No	606 (60.1)	
Family Member Diagnosed with COVID-19 ($n = 388$)	Yes	58 (14.9)	
	No	330 (85.1)	
Family Member Treated in Hospital ($n = 57$)	Yes	5 (8.8)	
	No	52 (91.2)	
Family Member Instructed to Self-Isolate or Quarantine ($n = 989$)	Yes	340 (33.7)	
	No	651 (64.3)	

3.2. Contact History

Almost 40% ($n = 387$) of the participants reported that to the best of their knowledge, a family member living in the same house was tested for COVID-19, and 15% ($n = 58$) of these participants reported that a family member in the same house was diagnosed with COVID-19 (see Table 2). Five participants reported that a family member was treated at a hospital, and 34% of the overall sample ($n = 340$) reported that a family member was instructed to self-isolate or be under quarantine.

3.3. Health Literacy and Concerns about COVID-19

Table 3 summarises the young people’s health literacy of COVID-19, their preferred sources of COVID-19 information, and the extent to which they found this information satisfactory. In total, 98% of the respondents agreed that an individual can catch COVID-19 through droplets, 96% agreed an individual can catch COVID-19 through contact via contaminated objects, and 83% agreed that COVID-19 can spread through the air. Chi-square analyses showed there were no significant differences in responses between adolescents and young adults or between young people with and without CHCs (see Table 3). The most commonly reported sources of health information for both age groups as well as for young people with and without CHC were the Internet and social media, followed by family members and television. Overall, most respondents were satisfied with the amount of health information available about COVID-19 (see Table 3). There were no significant differences regarding satisfaction accounted for by age group or CHC.

Table 3. Health literacy of COVID-19 and sources of health information accounted for by age group and chronic health condition.

Item	Total Sample	Age Group				Chronic Health Condition			
		12–17	18–25	χ^2	<i>p</i> -Value	Yes	No	χ^2	<i>p</i> -Value
You Catch COVID-19 through Droplets ($n = 875$)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)			<i>n</i> (%)	<i>n</i> (%)		
Agree	856 (97.6)	206 (96.7)	650 (97.9)	0.94	0.33	206 (97.2)	648 (97.7)	0.22	0.64
Disagree	21 (2.4)	7 (3.3)	14 (2.1)			6 (2.8)	15 (2.3)		
Contact via Contaminated Objects ($n = 906$)				0.21	0.64			2.48	0.12
Agree	870 (96.2)	225 (95.7)	647 (96.4)			203 (98.1)	667 (95.7)	0.72	0.40
Disagree	34 (3.8)	30 (13.4)	111 (17.8)			30 (14.7)	111 (17.2)		
The Air (Airborne) ($n = 848$)				2.30	0.13			0.71	0.39
Agree	707 (83.4)	194 (86.6)	513 (82.2)			174 (85.3)	533 (82.8)		
Disagree	141 (16.6)	30 (13.4)	111 (17.8)			30 (14.7)	111 (17.2)		
Sources of Health Information ($n = 1009$)									
Internet or Social Media	835 (82.8)	199 (74.3)	636 (85.8)			202 (86.0)	633 (81.8)		
Family Members	545 (54.0)	170 (63.4)	375 (50.6)			118 (50.2)	427 (55.2)		
Television	490 (48.6)	120 (44.8)	370 (49.9)			114 (48.5)	376 (48.6)		
Friends	340 (33.7)	95 (35.4)	245 (33.1)			75 (31.9)	265 (34.2)		
Radio	268 (26.6)	66 (24.6)	203 (27.3)			63 (26.8)	205 (26.5)		
Newspaper	144 (14.3)	23 (8.6)	122 (16.3)			39 (16.6)	105 (13.6)		
Other	49 (4.9)	13 (4.9)	36 (4.9)			14 (6.0)	35 (13.6)		
				<i>F</i>	<i>p</i> -Value			<i>F</i>	<i>p</i> -Value
Satisfaction with Health Information ($n = 980$)									
<i>M</i> (<i>SD</i>)	2.95 (0.85)	2.97 (0.84)	2.94 (0.86)	0.282	0.56	2.98 (0.84)	2.94 (0.85)	0.419	0.517
Very Satisfied: <i>n</i> (%)	198 (20.2)	50 (18.9)	149 (20.8)			48 (21.1)	150 (19.4)		
Satisfied: <i>n</i> (%)	624 (63.7)	182 (68.9)	443 (61.7)			146 (62.1)	478 (61.8)		
Dissatisfied: <i>n</i> (%)	103 (10.5)	18 (6.8)	85 (11.8)			22 (9.4)	81 (10.8)		
Very Dissatisfied: <i>n</i> (%)	17 (1.7)	2 (0.8)	15 (2.1)			2 (0.9)	15 (2.0)		
Do Not Know: <i>n</i> (%)	38 (3.9)	12 (4.5)	26 (3.6)			9 (4.0)	29 (3.9)		

Regarding concerns about COVID-19 (see Table 4), one-way ANOVA showed that young adults believed they were more likely to contract the virus than adolescents ($F(1, 968) = 7.53, p = 0.006, \eta^2 = 0.007$). No significant differences were found between these two age groups regarding their perceived likelihood of surviving COVID-19, as well as regarding the level of worry about a family member contracting COVID-19. One-way ANOVA showed that young people living with CHCs believed they would be less likely to survive COVID-19 than their counterparts without a CHC ($F(1, 968) = 7.53, p = 0.006, \eta^2 = 0.007$). However, no significant differences were found between young people with and without CHCs regarding their concerns about contracting COVID-19 or the level of worry about a family member contracting COVID-19 (see Table 4).

Table 4. Concerns about contracting and surviving COVID-19 accounted for by age group and chronic health condition.

Concerns about COVID-19	Total Sample	Age Group			Chronic Health Condition							
		12–17	18–25	F	p-Value	η^2	Yes	No	F	p-Value	η^2	
Likelihood of Contracting COVID-19 (n = 969)	M (SD)	2.49 (0.92)	2.36 (0.90)	2.54 (0.92)	7.53	0.006 *	0.007	2.59 (0.92)	2.46 (0.92)	3.71	0.05	0.003
	Very Likely: n (%)	90 (9.3)	14 (5.3)	76 (10.7)				29 (12.8)	61 (8.2)			
	Somewhat Likely: n (%)	458 (47.1)	114 (43.5)	344 (48.5)				111 (48.9)	346 (46.6)			
	Not Very Likely: n (%)	304 (31.3)	99 (37.8)	205 (28.9)				59 (26.0)	244 (32.8)			
	Not Likely at All: n (%)	80 (8.2)	22 (8.4)	58 (8.2)				22 (9.7)	58 (7.8)			
Do Not Know: n (%)	40 (4.1)	13 (5.0)	27 (3.8)	6 (2.6)	34 (4.6)							
Likelihood of Surviving COVID-19 (n = 970)	M (SD)	3.50 (0.92)	3.59 (0.90)	3.47 (0.93)	3.07	0.080	0.003	3.32 (0.98)	3.56 (0.90)	12.1	0.001 **	0.012
	Very Likely: n (%)	651 (66.9)	194 (74.0)	457 (64.3)				121 (53.3)	528 (71.0)			
	Somewhat Likely: n (%)	252 (25.9)	51 (19.5)	201 (28.3)				83 (36.6)	169 (22.7)			
	Not Very Likely: n (%)	18 (1.8)	5 (1.9)	13 (1.8)				7 (3.1)	11 (1.5)			
	Not Likely at All: n (%)	13 (1.3)	1 (0.4)	12 (1.7)				6 (2.6)	7 (0.9)			
Do Not Know: n (%)	39 (4.0)	11 (4.2)	28 (3.9)	10 (4.4)	29 (3.9)							
Worry Family Will Get COVID-19 (n = 968)	M (SD)	3.16 (0.77)	3.10 (0.80)	3.19 (0.76)	2.55	0.111	0.002	3.16 (0.83)	3.17 (0.75)	0.002	0.96	0.000
	Very Likely: n (%)	352 (36.3)	87 (33.1)	265 (37.4)				90 (39.6)	262 (35.3)			
	Somewhat Likely: n (%)	456 (47.0)	125 (47.5)	331 (46.8)				94 (41.4)	361 (48.7)			
	Not Very Likely: n (%)	133 (13.7)	41 (15.6)	9 (13.0)				33 (14.5)	99 (13.3)			
	Not Likely at All: n (%)	30 (3.1)	10 (3.8)	20 (2.8)				10 (4.4)	20 (2.7)			

* $p < 0.05$. ** $p < 0.001$.

3.4. Precautionary Measures against COVID-19

Table 5 shows the precautionary measures practiced by respondents in the 2 weeks preceding the time of the survey. Overall, 84% of participants reported always washing their hands with soap and water, 83% reported always covering their mouth when coughing or sneezing, and 80% reported wearing a mask regardless of the presence or absence of symptoms. A series of one-way ANOVAs showed that young adults were significantly more likely than adolescents to wear a mask regardless of the presence or absence of symptoms ($F(1, 956) = 16.9, p < 0.001, \eta^2 = 0.02$) and stay home due to concerns about catching COVID-19 ($F(1, 956) = 14.0, p < 0.001, \eta^2 = 0.02$). However, there were no significant differences between the two age groups with regard to the remaining four precautionary measures against COVID-19. The only precautionary measure that young people living with CHCs were significantly more likely to adhere to when compared with their counterparts was to stay home due to concerns about catching COVID-19 ($F(1, 956) = 9.44, p = 0.002, \eta^2 = 0.01$).

Table 5. Precautionary measures against COVID-19 accounted for by age group and chronic health condition.

Variable		Total Sample	Age Group			Chronic Health Condition			F	p-Value	η^2	
			12–17	18–25	F	p-Value	η^2	Yes				No
Cover Mouth when Coughing or Sneezing (n = 957)	M (SD)	4.80 (0.51)	4.80 (0.49)	4.79 (0.51)	0.007	0.93	0	4.75 (0.63)	4.81 (0.45)	2.56	0.110	0.002
	Always	786 (82.9)	215 (82.4)	581 (83.1)								
	Most of the Time	142 (14.8)	43 (16.5)	99 (14.2)								
	Sometimes	15 (1.6)	1 (0.4)	14 (2.0)								
	Once or Twice	4 (0.4)	1 (0.4)	3 (0.4)								
Never	3 (0.3)	1 (0.4)	2 (0.3)				2 (0.9)	1 (0.1)				
Avoid Sharing Utensils (n = 954)	M (SD)	4.06 (1.20)	4.15 (1.01)	4.03 (1.26)	1.73	0.19	0.001	4.07 (1.24)	4.06 (1.19)	0.013	0.91	0
	Always	463 (48.4)	117 (43.7)	346 (49.6)								
	Most of the Time	276 (28.8)	91 (34.0)	185 (26.5)								
	Sometimes	112 (11.7)	32 (12.4)	80 (11.5)								
	Once or Twice	29 (3.0)	10 (3.9)	19 (2.7)								
Never	77 (8.0)	9 (3.5)	68 (9.7)				21 (9.3)	56 (7.7)				
Wash Hands with Soap and Water (n = 957)	M (SD)	4.81 (0.48)	4.75 (0.56)	4.82 (0.45)	3.91	0.48	0.004	4.80 (0.51)	4.81 (0.47)	0.02	0.89	0
	Always	803 (83.6)	209 (80.1)	594 (85.0)								
	Most of the Time	131 (13.6)	43 (16.5)	88 (12.6)								
	Sometimes	23 (2.4)	7 (2.7)	16 (2.3)								
	Once or Twice	2 (0.2)	1 (0.4)	1 (0.1)								
Never	1 (0.1)	1 (0.4)	0 (0.0)				0 (0.0)	1 (0.1)				
Wash Hands Immediately after Coughing, Rubbing Nose, or Sneezing (n = 956)	M (SD)	3.77 (1.13)	3.68 (1.11)	3.80 (1.14)	2.37	0.12	0.002	3.84 (1.13)	3.75 (1.13)	1.16	0.28	0.001
	Always	282 (29.4)	62 (23.8)	220 (31.5)								
	Most of the Time	355 (37.0)	103 (39.6)	252 (36.1)								
	Sometimes	203 (21.2)	63 (24.2)	140 (20.0)								
	Once or Twice	55 (5.7)	13 (5.0)	42 (6.0)								
Never	64 (6.7)	19 (7.3)	45 (6.4)				13 (5.8)	50 (6.8)				
Wear a Mask Regardless of Presence or Absence of Symptoms (n = 957)	M (SD)	4.72 (0.65)	4.59 (0.76)	4.77 (0.59)	16.9	0 *	0.02	4.77 (0.57)	4.71 (0.66)	1.30	0.25	0.001
	Always	769 (80.1)	185 (70.9)	584 (83.5)								
	Most of the Time	141 (14.7)	55 (21.1)	86 (12.3)								
	Sometimes	34 (3.5)	14 (5.4)	20 (2.9)								
	Once or Twice	8 (0.8)	4 (1.5)	4 (0.6)								
Never	8 (0.8)	3 (1.1)	5 (0.7)				1 (0.4)	6 (0.8)				
Stay Home Due to Concerns about Catching COVID-19 (n = 957)	M (SD)	3.37 (1.35)	3.10 (1.38)	3.47 (1.33)	14.0	0 *	0.02	3.61 (1.29)	3.29 (1.37)	9.44	0.002 *	0.01
	Always	232 (24.2)	46 (17.6)	185 (26.5)								
	Most of the Time	275 (28.6)	69 (25.7)	205 (29.4)								
	Sometimes	216 (22.5)	66 (24.6)	150 (21.5)								
	Once or Twice	88 (9.2)	25 (9.6)	63 (9.0)								
Never	149 (15.5)	55 (21.1)	94 (13.5)				25 (11.1)	124 (16.9)				

* $p < 0.001$.

3.5. Gender Differences

There were no gender differences regarding knowledge of COVID-19 transmission, reported health status, or satisfaction with health information (see Table 6).

However, females were more likely to believe that there was an increased likelihood of contracting COVID-19 than males ($F(1, 953) = 8.91, p = 0.003, \eta^2 = 0.01$). They were also more worried about a member of their family contracting the virus than males ($F(1, 952) = 27.36, p < 0.001, \eta^2 = 0.03$) (see Table 6).

Table 6. Health status, knowledge of COVID-19, satisfaction with health information, and concerns about COVID-19 accounted for by gender.

Variable		Males	Females	χ^2	<i>p</i> -Value	
You Catch COVID-19 through Droplets (<i>n</i> = 861)		<i>n</i> (%)	<i>n</i> (%)	1.50	0.221	
	Agree	152 (96.2)	688 (97.9)			
Contact via Contaminated Objects (<i>n</i> = 891)	Disagree	6 (3.8)	15 (2.1)	0.054	0.817	
	Agree	168 (96.0)	690 (96.4)			
The Air (Airborne) (<i>n</i> = 836)	Disagree	7 (4.0)	26 (3.6)	0.326	0.568	
	Agree	136 (85.0)	562 (83.1)			
	Disagree	24 (15.0)	114 (16.9)			
				<i>F</i>	<i>p</i> -Value	η^2
Health Status (<i>n</i> = 983)	<i>M</i> (<i>SD</i>)	4.19 (0.81)	4.09 (0.92)	2.27	0.133	0.002
	Very Good: <i>n</i> (%)	79 (41.6)	299 (37.7)			
	Good: <i>n</i> (%)	74 (38.9)	318 (40.1)			
	Fair: <i>n</i> (%)	32 (16.8)	136 (17.2)			
	Poor: <i>n</i> (%)	5 (2.6)	25 (3.2)			
	Very Poor: <i>n</i> (%)	0 (0.0)	15 (1.9)			
Satisfaction with Health Information (<i>n</i> = 965)	<i>M</i> (<i>SD</i>)	2.89 (0.96)	2.96 (0.82)	1.56	0.212	0.002
	Very Satisfied: <i>n</i> (%)	40 (21.2)	154 (19.8)			
	Satisfied: <i>n</i> (%)	113 (59.8)	503 (64.8)			
	Dissatisfied: <i>n</i> (%)	19 (10.1)	83 (10.7)			
	Very Dissatisfied: <i>n</i> (%)	7 (3.7)	9 (1.2)			
	Do Not Know: <i>n</i> (%)	10 (5.3)	27 (3.5)			
Likelihood of Contracting COVID-19 (<i>n</i> = 955)	<i>M</i> (<i>SD</i>)	2.32 (0.93)	2.54 (0.90)	8.91	0.003 *	0.009
	Very Likely: <i>n</i> (%)	13 (7.0)	73 (9.5)			
	Somewhat Likely: <i>n</i> (%)	70 (37.6)	384 (49.9)			
	Not Very Likely: <i>n</i> (%)	75 (40.3)	224 (29.1)			
	Not Likely at All: <i>n</i> (%)	19 (9.8)	60 (7.8)			
	Do Not Know: <i>n</i> (%)	9 (4.7)	28 (3.6)			
Likelihood of Surviving COVID-19 (<i>n</i> = 956)	<i>M</i> (<i>SD</i>)	3.57 (0.91)	3.50 (0.92)	0.840	0.360	0.000
	Very Likely: <i>n</i> (%)	136 (73.1)	506 (65.7)			
	Somewhat Likely: <i>n</i> (%)	35 (18.8)	221 (27.4)			
	Not Very Likely: <i>n</i> (%)	5 (2.7)	13 (1.7)			
	Not Likely at All: <i>n</i> (%)	4 (2.2)	9 (1.2)			
	Do Not Know: <i>n</i> (%)	6 (3.2)	31 (4.0)			
Worry Family Will Get COVID-19 (<i>n</i> = 954)	<i>M</i> (<i>SD</i>)	2.90 (0.81)	3.23 (0.75)	27.4	<0.001 **	0.028
	Very Worried: <i>n</i> (%)	39 (21.1)	307 (39.9)			
	Somewhat Worried: <i>n</i> (%)	102 (55.1)	348 (45.3)			
	Not Very Worried: <i>n</i> (%)	16.1 (16.8)	97 (12.6)			
	Not Worried at All: <i>n</i> (%)	13 (7.0)	17 (2.2)			

* *p* < 0.05. ** *p* < 0.001.

Gender differences were also evident regarding adherence to all precautionary measures against COVID-19, except avoiding sharing utensils (see Table 7). Specifically, females reported that they were more likely than males to cover their mouths when coughing and sneezing ($F(1, 941) = 7.00, p = 0.008, \eta^2 = 0.01$), wash their hands with soap and water ($F(1, 941) = 14.79, p < 0.001, \eta^2 = 0.02$), wash their hands immediately after coughing, rubbing their nose, or sneezing ($F(1, 940) = 7.18, p = 0.007, \eta^2 = 0.01$), wear a mask regardless of the presence or absence of symptoms ($F(1, 941) = 32.65, p < 0.001, \eta^2 = 0.03$), and stay at home because of concerns about catching COVID-19 ($F(1, 941) = 15.29, p < 0.001, \eta^2 = 0.02$).

Table 7. Precautionary measures against COVID-19 accounted for by gender.

Variable		Males	Females	F	p-Value	η^2
Cover Mouth when Coughing or Sneezing (<i>n</i> = 943)	<i>M</i> (<i>SD</i>)	<i>n</i> (%) 4.71 (0.60)	<i>n</i> (%) 4.82 (0.47)	7.00	0.008 *	0.007
	Always	139 (76.8)	646 (84.8)			
	Most of the Time	35 (19.3)	102 (13.4)			
	Sometimes	5 (2.8)	10 (1.3)			
	Once or Twice	1 (0.6)	2 (0.3)			
	Never	1 (0.6)	2 (0.3)			
Avoid Sharing Utensils (<i>n</i> = 941)	<i>M</i> (<i>SD</i>)	4.06 (1.17)	4.06 (1.21)	0.001	0.974	0.000
	Always	85 (47.2)	368 (48.4)			
	Most of the Time	52 (28.9)	219 (28.8)			
	Sometimes	24 (13.3)	88 (11.6)			
	Once or Twice	7 (3.9)	22 (2.9)			
	Never	12 (6.7)	64 (8.4)			
Wash Hands with Soap and Water (<i>n</i> = 943)	<i>M</i> (<i>SD</i>)	4.69 (0.58)	4.84 (0.43)	14.79	<0.001 **	0.016
	Always	136 (75.1)	655 (86.0)			
	Most of the Time	34 (18.8)	94 (12.3)			
	Sometimes	11 (6.1)	11 (1.4)			
	Once or Twice	0 (0.0)	1 (0.1)			
	Never	0 (0.0)	1 (0.1)			
Wash Hands Immediately after Coughing, Rubbing Nose, or Sneezing (<i>n</i> = 942)	<i>M</i> (<i>SD</i>)	3.57 (1.15)	3.82 (1.12)	7.18	0.007 *	0.008
	Always	43 (23.6)	234 (30.8)			
	Most of the Time	61 (33.5)	288 (37.9)			
	Sometimes	47 (25.8)	154 (20.3)			
	Once or Twice	19 (10.4)	35 (4.6)			
	Never	12 (6.6)	49 (6.4)			
Wear a Mask Regardless of Presence or Absence of Symptoms (<i>n</i> = 943)	<i>M</i> (<i>SD</i>)	4.49 (0.94)	4.78 (0.53)	32.65	<0.001 **	0.034
	Always	124 (68.5)	631 (82.8)			
	Most of the Time	36 (19.9)	104 (13.6)			
	Sometimes	12 (6.6)	21 (2.8)			
	Once or Twice	3 (1.7)	5 (0.7)			
	Never	6 (3.3)	1 (0.1)			
Stay Home Due to Concerns about Catching COVID-19 (<i>n</i> = 943)	<i>M</i> (<i>SD</i>)	3.01 (1.40)	3.45 (1.33)	15.29	<0.001 **	0.016
	Always	31 (17.1)	197 (25.9)			
	Most of the Time	45 (24.9)	223 (29.3)			
	Sometimes	40 (22.1)	172 (22.6)			
	Once or Twice	25 (13.8)	63 (8.3)			
	Never	40 (22.1)	107 (14.0)			

* $p < 0.05$. ** $p < 0.001$.

4. Discussion

The present study was conducted between October 2020 and May 2021. We aimed to explore health literacy related to the COVID-19 pandemic, relevant concerns, and adherence to precautionary measures in a sample of adolescents and young adults aged 12–25 years old ($n = 1009$) residing in Ireland. We also aimed to offer a unique insight by capturing the differences between two distinct age groups: adolescents (aged 12–17 years old) and young adults (aged 18–25 years old). Finally, we explored the differences between young people living with and without CHCs. Overall, our findings highlight that young people residing in Ireland possessed sufficient knowledge about COVID-19 transmission routes and adhered to most precautionary measures as recommended by the country's respective public health authority (Health Service Executive (HSE)). Young people indicated that their most preferred sources of obtaining health information related to COVID-19 were the Internet and social media, followed by family members and television. As an overall sample, young people believed that they were moderately likely to contract COVID-19 and highly likely to survive COVID-19 should they get infected. However, these patterns

seemed to differ between adolescents and young adults as well as between young people living with and without CHCs. To our knowledge, this is the first study to provide evidence in this field in Ireland.

In terms of health literacy, most participants reported good knowledge of aspects surrounding COVID-19 transmission, which generally corroborates the findings from other studies in similar cohorts (e.g., [13,39,40]). We found no statistical differences accounted for by age, gender, or the absence or presence of a CHC. The COVID-19 pandemic is a global public health crisis without precedent that has been the epicentre of attention for almost two years for governments, authorities, as well as for national and international health organisations. Hence, the COVID-19 health information which was disseminated intensively and widely, especially during the period that we collected data for this study (8 months after the outbreak), should have been crystallised by young people. Additionally, Ireland's public health provider (HSE) has delivered an extensive and prolonged online (e.g., through social media or websites) and offline (e.g., through leaflets and signs posted on public places) awareness campaign, reaching out to individuals in most contexts including schools and universities. This may have contributed to increased levels of knowledge about the virus, especially considering that a great proportion of our participants obtained information through social media or the Internet.

Overall, most participants reported adhering to precautionary measures against COVID-19. The less frequently reported measures were staying at home due to concerns about catching COVID-19 and washing hands immediately after coughing, rubbing the nose, or sneezing. Staying at home has also been reported as a measure that young people were less likely to adhere to [41]. We detected statistically significant differences between adolescents and young adults in two aspects: young adults were more likely to wear a mask and stay home due to concerns about catching COVID-19 than their younger counterparts. Studies in adult populations tend to report a similar trend, with younger cohorts being less compliant with precautionary measures (e.g., [19]).

Young people with CHCs were more likely to stay at home than their counterparts, while they did not differ in relation to the extent of adherence to any other measure. This may be because individuals with CHCs are considered a high-risk cohort susceptible to severe consequences if contracting the virus, which has been very extensively communicated through international and national public health awareness COVID-19 campaigns. In addition, at the time of data collection (October 2020–May 2021), vaccinations were either not rolled out yet or may have just started to be administered. Thus, the young people from our sample with CHCs may have been still cautious about leaving home. Notably, young people with CHCs felt that they were less likely to survive COVID-19 should they contract the disease. Health literacy has been reported as a positive predictor of awareness of COVID-19 and engagement in precautionary measures [42,43]. Because the young people from our sample showed high levels of health literacy, this may explain why young people with CHCs did not differ from their counterparts in any aspect of health literacy but only in their perceived likelihood to survive should they contract the disease. In conclusion, our findings in general highlight that regardless of age group or the presence or absence of CHCs, young people in Ireland were highly likely to be compliant with protective measures against contracting COVID-19.

Overall, the young people from our sample reported being satisfied with the available health information on COVID-19. Their preferred source for accessing information was the Internet and social media (83%), followed by family members (54%) and television (49%). The least preferred sources were friends (34%), radio (27%), and newspapers (14%). This pattern of preferred sources seemed to be consistent across adolescents and young adults as well as across young people with or without CHCs in our sample. The preferred sources of obtaining health information reported by young people residing in Ireland were similar to a study conducted on Norwegian adolescents [30]. However, other studies reported a different pattern of preferred sources in young people. For example, in a study from Jordan on young adults, social media was the preferred source of information, while family

and friends were reported as one of the least preferred sources [44]. While the Internet/ and social media seem to come first in young people's preferences, differences in other sources of health information such as family or television indicate that the unique country context may play a role in young people's choices for obtaining health information. It seems that when it comes to obtaining health information, young people use different sources, including expected channels for their age (i.e., social media) as well as more traditional ones, such as television. Even though the health information examined by this study was specifically related to COVID-19, it is important for information providers to consider that young people aged as young as 12 years old may be among their audiences. Thus, providing inclusive and tailored information could make health information more accessible and comprehensible to younger audiences.

We found no gender differences in knowledge of COVID-19 and satisfaction with health information. However, the females of our sample were more likely to adhere to all precautionary measures (except sharing utensils) than males, believed that they were more likely to become infected and were more worried about a family member becoming infected. Very similar findings were reported by two studies on Norwegian young people [13,30]. In a study from eight countries, adult females perceived COVID-19 as a far more serious health problem than males, which may explain why young females were more likely to adhere to precautionary measures than males as well as to report their belief that they had a greater likelihood of contracting COVID-19 [45]. Furthermore, gender differences in reporting worry that a family member getting sick may be explained by existing evidence suggesting that, in general, females tend to report higher levels of health anxiety in relation to this pandemic (e.g., [46]). Notably, our findings are in contrast with the findings from some other studies (e.g., [29]), which may be due to varying contextual or research methodological factors. This highlights the importance of considering gender differences in health literacy when designing awareness campaigns or programmes targeting COVID-19, as well as other major public health issues.

Our findings have important implications that can inform the knowledge of youth health literacy and health-related attitudes that go beyond the COVID-19 pandemic. The discrepancy of evidence for different aspects of health literacy highlights that contextual factors such as country, age group, gender, and absence or presence of a CHC are important characteristics to consider when designing a public health awareness campaign targeting a global health crisis. Adolescents and young adults comprise unique developmental cohorts warranting tailored health promotion strategies. While the urgent need of widely communicating health information about the pandemic as fast as possible has not allowed HSE to deliver campaigns targeting specific population cohorts, this should be incorporated into plans for responding to future major public health events.

Despite its strengths, the present study has some limitations which should be considered when interpreting results. First, this was a cross-sectional study that collected information at one time point. Although this provides a significant insight into young people's health literacy, attitudes, and concerns about COVID-19, it would have been more illuminating to capture these aspects across different time points during this pandemic. Second, our aim was to provide a descriptive understanding of young people's responses to COVID-19 health-related aspects rather than explore patterns of relationships. Hence, our findings should be interpreted as such. This should be especially considered in relation to not employing standardised scales to measure variables in our research, because at the time of data collection, there were none. Third, we detected small effect sizes for the respective analyses, which indicates a low strength of statistical differences. Thus, we warrant caution when interpreting our findings. Fourth, adolescent recruitment mostly took place through secondary schools, where the school representative distributed the survey link to parents who, in turn, had to consent before sharing the link with their son or daughter. Because these young people were invited indirectly to participate in the study, this two-layer procedure may have excluded some adolescents who wished to participate in this research. Finally, despite the large sample size, there was an overrepresentation of

females, which should be considered when interpreting our findings. Considering that at the time of writing this paper, we may be heading towards the end of this pandemic, future studies could explore aspects of health literacy in youth, such as components of public health campaigns that were found to be particularly useful for obtaining knowledge on COVID-19, including the vaccine roll-out. For instance, conducting focus groups with adolescents and young adults, with young people with CHC, with females and males, as well as with other cohorts such as racial or ethnic minority groups, young people with disabilities, or marginalised youth could offer a deep insight into young people's digest and use of the health information surrounding COVID-19 that was massively communicated during the pandemic. This knowledge could be employed in forming responses to future public health crises.

5. Conclusions

The present study offered a unique insight on young people's health literacy of COVID-19 and compliance with precautionary measures during a period of government restrictions and lockdowns in Ireland. Our findings highlighted that young people possessed sufficient knowledge of COVID-19 and generally adhered to public health measures against the virus. Contextual factors such as country, age group, gender, and the presence or absence of a chronic health condition should be accounted for in planning targeted public health awareness campaigns. Despite capturing health literacy related to COVID-19 at a specific point in time, our findings have considerable implications that can inform recommendations for existing endemics and communicable diseases.

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Informed Consent Statement: Informed consent was obtained from all participants involved in the study.

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