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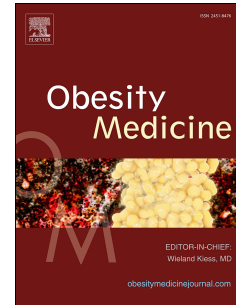
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The Effect of Knowledge on Healthcare Professionals' Perceptions of Obesity

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Abstract

Aims: We aim to investigate the link between obesity prejudice and knowledge of obesity, and any differences in prejudice and knowledge amongst healthcare professional (HCP) groups.

Methods: A survey consisting of two previously validated questionnaires assessing obesity prejudice (Attitudes Towards Obese Persons, ATOP¹) and knowledge (Obesity Risk Knowledge Scale, ORK-10²) were sent to HCP groups in an East Anglian NHS trust. An R^2 coefficient was used to determine a correlation between the two scores, and one-way analysis of variance (ANOVA) to assess differences between HCP groups.

Results: 436 responses were received, 372 of which were complete and analysed. HCP groups included consultants, junior doctors, nurses, health care assistants, operating department professionals, and pharmacists. The average ATOP and ORK-10 scores were 69.1/120 and 7.09/10 respectively. A statistically significant difference was found between HCP groups' ORK-10 scores ($p < 0.05$); there was no statistically significant difference demonstrated between the ATOP scores ($p = 0.50$).

Conclusions: Obesity prejudice was demonstrated amongst HCPs, although this did not correlate with knowledge of obesity. Knowledge of obesity was low amongst many HCPs and could be improved via targeted educational strategies aiming to aid staff in the care of people with obesity.

Keywords: obesity; prejudice; knowledge; healthcare professionals; weight stigma

Introduction

Negative attitudes towards people with obesity is a widely described issue still prevalent today^{3,4}. This obesity prejudice, otherwise known as weight bias or anti-fat prejudice, has been shown to affect job opportunities for those affected and often leading to rejection from peers⁵. This stigma translates to detrimental effects on health and psychological functioning⁶. It also does not lead to weight loss, often perpetuating unhealthy coping mechanisms causing the opposite effect⁶. Despite this evidence, obesity prejudice is frequently described amongst healthcare professionals (HCPs), with concerning implications.

The number of patients seeking care in the NHS with obesity is increasing. In 2014/15, 525,000 patients were admitted to hospital with obesity recorded as a primary or secondary diagnosis⁷. Healthcare professionals in every specialty will inevitably be expected to manage these patients, yet it is well-documented that negative attitudes to obesity is prevalent amongst this group. A systematic review of 15 mixed-methods studies investigated the attitudes of multiple HCP groups, including physicians, nurses, dieticians, and both medical and nursing students, found bias amongst all groups⁸. Some studies found that a proportion of HCPs held stereotypes of people with obesity being “lazy”, “unsuccessful” and “stupid”, amongst other negative beliefs⁹⁻¹¹.

Worryingly, these prejudices can alter the management and care given to affected patients. Gudzone, Beach, Roter and Cooper (2013) conducted a cross-sectional analysis correlating physician-patient rapport shown in audio-recorded appointments and patient BMI¹². They concluded that physicians were more likely to show less emotional rapport towards people with a higher BMI than those without. The weight of a patient has been shown to affect the clinical judgement of physicians, for instance by assigning more negative psychological symptoms to those who are obese than those who are not¹³. Negative attitudes about obesity leading to discriminative behaviours is apparent in other HCPs, for example nurses and dieticians^{14,15}. Furthermore, the discrimination demonstrated can ultimately cause a barrier to accessing healthcare. Friedman et al. (2010) conducted a qualitative analysis assessing reasons why women with obesity were less likely to attend mammography screening for breast cancer. They found that insensitive comments about weight and gowns that could not accommodate them were contributing factors¹⁶. From this evidence, it is clear that weight bias amongst HCPs detrimentally affects patient healthcare, which would contradict the ethical principles of non-maleficence and justice that are part of the four pillars of medical ethics. It is therefore necessary to understand the factors contributing to this prejudice in order to discover how it can be reduced amongst healthcare professionals.

Previous research into other forms of prejudice have suggested knowledge as a factor in reducing stigma. For instance, in an analysis of public attitudes towards mental illnesses in Korea, Jang et al. (2012) found levels of prejudice decreased with higher educational backgrounds¹⁷. Additionally, in the field of mental health, Australian states participating in public health initiatives to improve public knowledge about depression led to changes in belief in the benefit of treatment and seeking help compared to states that did not implement the programme¹⁸. Obesity is often seen as a condition that is completely in the control of the individual, thus leading to

blame and the ideology that these negative attitudes are acceptable. Studies looking at reducing negative attitudes of obesity by increasing knowledge on the uncontrollable factors of weight have found conflicting results. O'Brien et al. (2010) randomised health promotion and public health degree students into three obesity curriculums focusing on the controllable or uncontrollable factors affecting obesity, or a neutral curriculum¹⁹. They found that two forms of implicit anti-fat prejudice were reduced in the uncontrollable factors group, and one form increased in the controllable factors group. Similarly, Hilbert (2016) found that weight prejudice was reduced in 128 university students following an educational session focusing on the genetic and environmental interactions in the aetiology of obesity²⁰. Conversely, Teachman et al. (2003), found that informing adult participants that obesity is mainly due to genetic factors did not result in a decrease in bias²¹. However, it is possible that participants' existing knowledge affected the results of these studies. There is a paucity of research looking into the effect of knowledge on obesity prejudice in HCPs, as many of these papers predominantly investigated students. Therefore, this study aims to explore the association between prejudice against people with obesity and knowledge of obesity amongst healthcare professionals specifically. A secondary aim is to assess differences in prejudice and knowledge between HCP groups.

Subjects, Materials and Methods

Ethical approval was obtained from the faculty of medicine and health sciences research and ethics committee at the University of East Anglia (reference 2014/2015 53)²².

Two previously validated questionnaires were combined into a survey and distributed to HCPs in a large East Anglian NHS trust. The Attitudes Towards Obese Persons (ATOP) is a tool to measure the prejudices held by individuals towards people with obesity¹. The ATOP score demonstrates an inversely proportional relationship, such that a higher score (maximum 120) indicates less prejudice; the average ATOP score attained in the study by the authors developing ATOP ranged from 63.9 to 67.6¹. The Obesity Related Knowledge-10 (ORK-10) measures the level of knowledge an individual has regarding obesity via 10 questions, with a maximum attainable score of 10². A higher score indicates greater knowledge regarding obesity as measured by the ORK-10; *Swift et al.* indicate that a score of 4 may be viewed as low, given that it was the median score achieved by non-experts; 9 may be seen as a high score, as achieved by the expert group. Both questionnaires demonstrate high internal consistency, with Cronbach's $\alpha=0.8-0.84$ and $\alpha=0.83$ for the ATOP and ORK-10 questionnaires respectively^{1,2}.

The combined questionnaire was initially uploaded as an online survey on SurveyMonkey®. Participant recruitment was conducted at two separate time points. Initially, the online survey was distributed amongst medical students at Norwich Medical School in April 2015. Further responses were collected from HCPs between March and June 2017. For this second wave, surveys were distributed both via

Survey Monkey® and paper handouts, which were collected later. All medical students at Norwich Medical School in 2015 were eligible to participate in this study, as were all healthcare professionals at the East Anglian NHS Trust in 2017. Sufficient information regarding the purpose of this study was provided at the beginning of the survey, and consent was implied if participants completed the questionnaires. Basic demographic data, gender and occupation, were collected alongside, and all responses received were kept anonymous.

Both descriptive and inferential statistics were planned as the means of data analysis. R^2 Coefficients of determination were used to determine whether a correlation exists between knowledge of obesity (ORK-10 score) and prejudice against people with obesity (ATOP score). One-way analysis of variance (ANOVA) was used to determine whether there were statistically significant differences between HCP groups with regards to both ATOP and ORK-10.

Results

We received 436 responses from healthcare professionals. Of these, 64 did not fully complete the surveys and thus were excluded from analysis. For each question in the survey, a range of 1-15 participants left it unanswered. Consequently, we analysed the data of 372 participants who completed the survey fully. Complete surveys were necessary in order to calculate the ATOP and ORK-10 scores without skewing results. Participant demographics are summarised in *Table 1*. The largest group was composed of 124 medical students and the smallest of 8 dieticians. The group labelled “other” included radiographers, midwives, theatre technicians, pharmacy assistants and assistant practitioners. *Figure 1* illustrates the average ATOP and ORK-10 scores achieved by each occupational group. The mean ATOP score was 69.1/120 (SD \pm 14.9, range 66.8-80.1); the mean ORK-10 score was 7.09/10 (SD \pm 1.82, range 5.2-9.0). ATOP scores were relatively constant across the different professions, with dieticians demonstrating the least prejudice (80.1/120), indicated by a higher score; consultants demonstrated the greatest prejudice (66.8/120). Knowledge regarding obesity, as measured by the ORK-10 was very variable. Dieticians performed the best with a mean of 9/10; ODPs demonstrated the least knowledge regarding obesity, scoring an average of 5.2/10. A statistically significant difference was found between groups' ORK-10 scores when conducting a one-way ANOVA ($p < 0.05$); there was no statistically significant difference demonstrated between groups' ATOP scores on one-way ANOVA ($p = 0.50$).

The mean ATOP scores revealed statistically significant gender differences in prejudice against people with obesity. Female participants scored higher with a mean ATOP score of 71.6/120 (SD \pm 14.3) in comparison with male participants (64.5/120, SD \pm 15.0; $p < 0.001$). This difference in ATOP scores was found to be statistically significant ($p < 0.001$). Upon further analysis, medical students (mean 71.5 female vs 64.7 male, $p = 0.02$) and the “Other” HCP group (mean 76.0 female vs 57.3 male, $p = 0.001$) demonstrated statistically significant difference between female and male participants when using a two-tailed Student's T-Test. The remaining HCP groups showed similar trends but were not statistically significant.

There was a trend towards a negative correlation between increasing ATOP scores and ORK-10 scores, as demonstrated in *Figure 2*. Thus, as levels of prejudice against people with obesity decreased, knowledge held about obesity by the individual tended to be lower. However, the coefficient of determination demonstrated that this negative correlation was very weak ($R^2=0.00784$).

Discussion

The results showed a lack of significant correlation between knowledge scores and levels of prejudice. This finding adds to previous research suggesting knowledge around obesity does not necessarily lead to reduced prejudice, although research into this area has been conflicting. This study solely evaluated healthcare professionals. Therefore, the baseline knowledge level of HCPs would be expected to be higher than that of the general population and achieve an ORK-10 score closer to 9, which may help to explain the difference in results compared to studies only looking at, for example, students. These results suggest that educational initiatives to improve knowledge levels may not help to reduce obesity prejudice amongst HCPs. However, it was still identified that knowledge scores were low amongst many HCP groups, thus educational initiatives may still be of value in improving the management and care given to patients with obesity. Unsurprisingly, dietitians were found to have the highest average knowledge score, although the sample for this group was small. Consultants scored an average of 7.8 on the ORK-10; however, considering they are highly trained professionals, a score closer to the 'expert' level of 9 would be expected². They also demonstrated the highest level of prejudice, which is again concerning considering their levels of experience and the key role they play in the management of those with obesity.

ATOP scores showed the presence of obesity prejudice amongst healthcare professionals, although there was a lot of individual differences. Therefore, there is room for improvement in diminishing negative attitudes amongst healthcare staff. Interestingly, this study found male participants were more likely to show higher levels of prejudice, although this is likely due to confounding factors. Given that knowledge was not found to significantly correlate with prejudice, it is necessary to explore other factors leading to bias in order to reduce it. In a systematic review of papers investigating ways to reduce anti-fat prejudice amongst a varied participant group, *Danielsdóttir, O'Brien and Cio (2010)* also identified the use of empathy as a potential method²³. The results of this review, however, suggested that this too was an ineffective method of reducing biases. For instance, *Teachman et al. (2003)* found that reading first-person narratives describing stigma experienced by persons with obesity failed to reduce prejudice scores amongst participants²¹. However, the studies investigating the effect of empathy are limited, given they have not been conducted amongst healthcare professionals and so may not be generalizable to this group. Future research is necessary to elucidate this impact.

Furthermore, *Puhl, Phelan, Nadglowski and Kyle (2016)* differentiate between methods to reduce implicit and explicit bias towards people with obesity²⁴. They propose that explicit bias, which is consciously and deliberately expressed, may be reduced by education of obesity as a disease with causes. On the other hand,

implicit bias, which is unconscious and involuntary, may be reduced by educating healthcare providers of the negative impact this prejudice may have on the quality of care given. Therefore, it is possible that improving knowledge in this area may correlate with reduced prejudice levels. However, as our study only assessed knowledge of obesity, further research could discern whether there is a correlation between awareness of the effects of weight bias on healthcare and prejudice levels.

Other techniques that have been described to target prejudice include exposure to counter-stereotypical exemplars to challenge stigmatizing beliefs. One study found that media either promoting or refuting stereotypes about African-American persons shaped viewers' personal opinions²⁵. In practice, it is possible that positive, shared experiences with patients or peers who are obese may challenge stereotypes and reduce bias. Indeed, Phelan et al. (2015) found a correlation between implicit and explicit weight bias and reduced positive contact with patients with obesity²⁶. They suggested more opportunities for positive contact be made during training. This, however, would be difficult to achieve in qualified healthcare professionals who will inevitably have many mixed experiences with patients with obesity, just as they would with any service user.

Study Limitations

Although this study did not find a significant correlation between knowledge of obesity and prejudice levels, it is important to note that the results are limited by any weaknesses in the study methods. For instance, two pre-published scales were used as measures of knowledge and of prejudice; whilst validated, they may not fully reflect the complex nature of bias. It is also possible that participants are aware of any explicit biases they hold, and so may not have answered questions honestly in order to prevent these from becoming known. However, every effort was made to keep results anonymous and participants were assured of this. Prejudice and its origins are controversial and emotive topics. Often it is difficult to garner completely truthful responses from participants, especially since many biases may be implicit. In addition, this study only studied negative opinions, which may not necessarily translate to discriminatory behaviours that would affect healthcare. In order to explore this, observational studies would have to be carried out to see if more knowledgeable HCPs are less likely to act discriminately towards patients with obesity.

The main analysis stemmed from fully-completed survey results to avoid very low scores caused by blank answers, which would otherwise skew the data. Overall the number of questions left unanswered by participants ranged from 1-15 depending on the question. These drop-outs could be explained by a lack of time in a healthcare professionals' busy work life, or the nature of the questions meaning participants are not willing to answer. The question with the highest non-response rate came from the ATOP questionnaire, asking participants how strongly they agreed or disagreed with the statement "obese people are more emotional than non-obese people". Participants may be less comfortable answering questions they find more divisive, which could explain why some questions were skipped more than others.

This study was conducted within one NHS hospital and medical school in England, and so may not be generalizable towards specialist hospitals or other countries. This

is especially pertinent since prejudice is known to be affected by cultural and social norms^{27,28}. It is important to take these weaknesses into account when applying the results, and future research would aim to include further trusts and allied health professionals.

Conclusions

Overall, this study did identify the presence of obesity prejudice across healthcare professionals, although this did not correlate to levels of knowledge of obesity. This would suggest that further education on this topic would not be effective in reducing bias, although more research needs to be conducted to see if improving knowledge of the effects of prejudice would be beneficial.

Conflicts of interest: none.

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Figures and Tables

Table 1: Participant Demographics

Occupation	Total number of participants		Number of participants fully completing survey	
	Frequency (%)	Sex distribution: Female (%)	Frequency (%)	Sex distribution: Female (%)
Medical Student	136 (31)	90 (66)	124 (33)	82 (66)
Nurse	74 (17)	64 (86)	61 (16)	52 (85)
Consultant	69 (16)	25 (36)	59 (16)	23 (39)
Junior Doctor	43 (10)	25 (58)	38 (10)	22 (58)
Healthcare Assistant (HCA)	21 (5)	18 (86)	17 (5)	14 (82)
Operating Department Practitioner (ODP)	22 (5)	5 (23)	15 (4)	4 (27)
Pharmacist	18 (4)	12 (67)	14 (4)	8 (57)
Dietician	10 (2)	10 (100)	8 (2)	8 (100)
Other	44 (10)	42 (73)	36 (10)	26 (72)
Total	437	281 (64)	372	239 (64)

Figure 1: Average ATOP and ORK-10 score by occupation

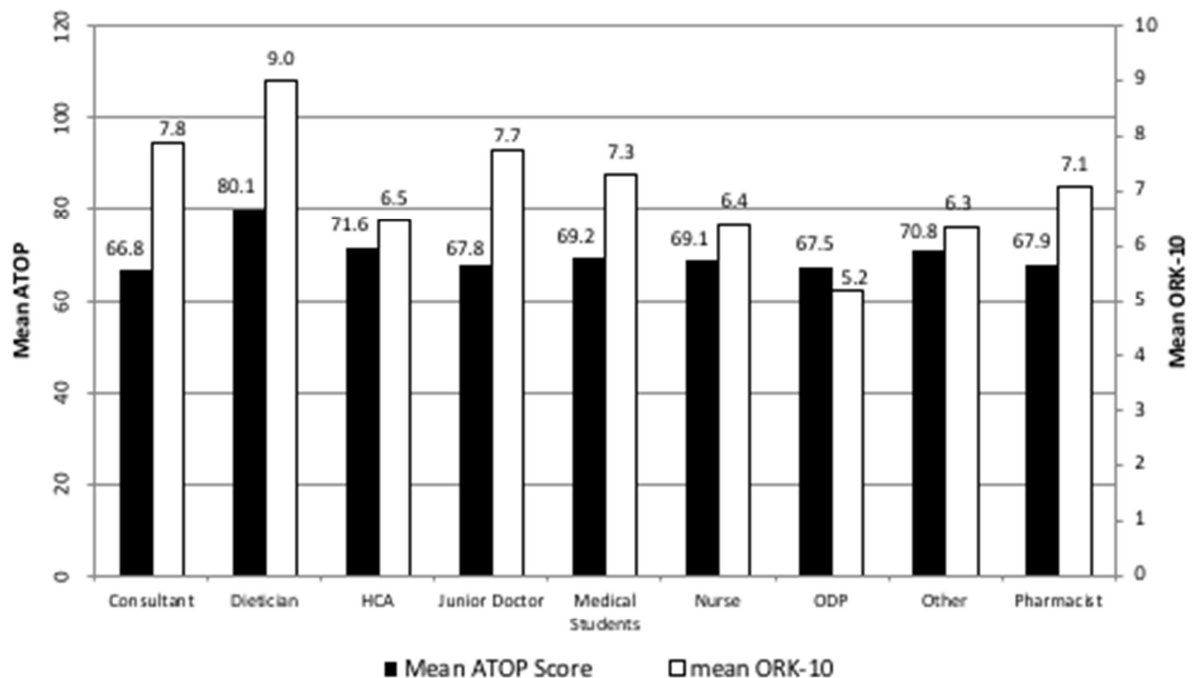
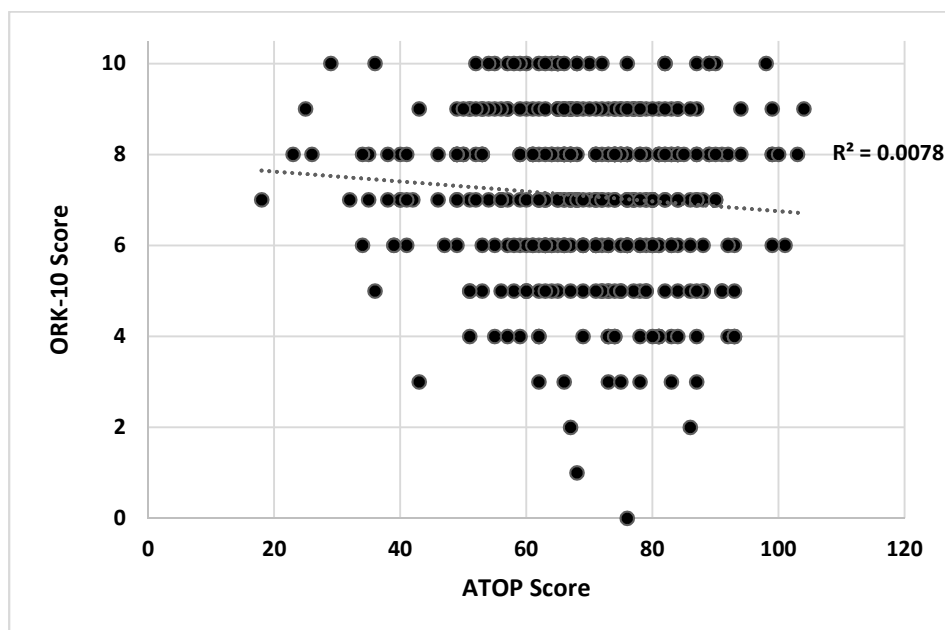


Figure 2: Correlation between ATOP and ORK-10



Highlights

- Obesity prejudice did not correlate with knowledge of obesity.
- Knowledge of obesity was relatively low amongst healthcare professionals.
- Obesity prejudice was demonstrated amongst healthcare professionals.
- Consultants were shown to have higher obesity prejudice scores.